A Plan for Industrial Land and Sustainable Industry in the City of Atlanta:

Background Information

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Industrial Policy: Case Studies

INDUSTRIAL POLICY: CASE STUDIES

The policy team researched ten case study cities to identify a range of industrial expansion and retention policies offered throughout the United States and Canada. The cities reviewed included: Baltimore, Charlotte, Chicago, Los Angeles, Minneapolis, New York, Portland, San Jose, Seattle, and Vancouver. Tables 1, 2, and 3 summarize prominent measures utilized by each city. This report will highlight the traditional and innovative policies found on the tables, as well as financial incentives offered by case study cities. A subsequent report will consider the most suitable policies for the City of Atlanta.

TABLE 1: FINANCIAL INCENTIVES AND PROGRAMS

City and State	Tax Breaks	TAD/TIF	Low Interest Loans and Bonds
Baltimore, MD	X		X
Charlotte, NC			X
Chicago, IL	X	X	X
Los Angeles, CA			
Minneapolis, MN		X	X
New York, NY	X		
Portland, OR	X	X	X
San Jose, CA	X		
Seattle, WA			
Vancouver, BC			

TABLE 2: LAND USE POLICIES					
City and State	**Zoning Policies**	**Industrial Districts**	**Brownfield Development**	**Infrastructure Investment**	**Property Acquisition**
Baltimore, MD	X	X	X	X	X
Charlotte, NC	X		X		
Chicago, IL	X	X			X
Los Angeles, CA	X				
Minneapolis, MN		X			X
New York, NY	X	X		X	
Portland, OR	X		X	X	X
San Jose, CA	X	X			
Seattle, WA	X	X	X		
Vancouver, BC	X	X			

TABLE 3: SUPPLEMENTARY PLANS AND TOOLS						
City and State	**Buffering and Zoning Restrictions**	**Job Training**	**Land Inventories**	**Marketing Assistance**	**Business Counseling**	**Supplementary Plans and Studies**
Baltimore, MD	X	X	X			
Charlotte, NC			X			
Chicago, IL	X	X	X	X		
Los Angeles, CA		X	X	X		X
Minneapolis, MN	X	X	X			X
New York, NY	X	X	X		X	X
Portland, OR	X	X	X			X
San Jose, CA			X			X
Seattle, WA	X		X			
Vancouver, BC			X			

Baltimore, Maryland

The *Industrial Land Use Analysis* for the City of Baltimore details the current industrial land use, industrial policies, and financial incentives in the City (Bay Area Economics, 2004). In addition, this analysis provides specific recommendations on the expansion and retention of Baltimore's industrial base. Many of the proposed land use policies and incentives are designed to attract maritime industry and rehabilitate the existing industrial use near Baltimore's Inner Harbor. Baltimore's industrial areas, like many in the United States, have experienced encroachment and rezoning over time.

Land Use Policies for Baltimore

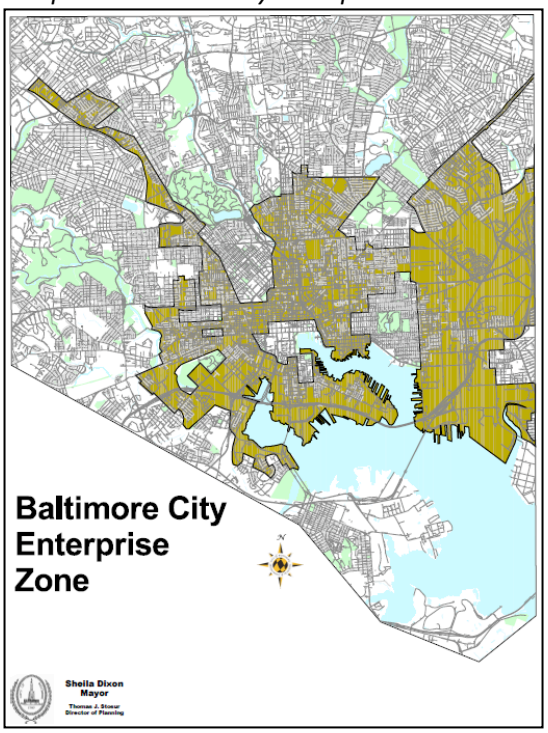
In 2002, with approval by the State General Assembly, the City was granted the use of eminent domain (Bay Area Economics, 2002). The City uses eminent domain to acquire blighted land suitable for redevelopment. Currently, the City of Baltimore has three established industrial districts zoned as M-1, M-2, and M-3. In the M-1 district, uses considered relatively nuisance-free and compatible with adjacent business and residential districts are encouraged. The M-2 district allows M-1 uses, uses that are considered moderate nuisances, and general, but not heavy, industry. The M-3 district allows M-1 and M-2 uses, as well as heavy industry. These industrial districts are intended to encourage:

- Growth and stability of industry
- Fortify the City's economic base
- Provide flexibility to meet the needs of evolving industrial technology
- Maintain the district's character and its suitability for specific uses
- Preserve and develop Baltimore's tax base and employment potential (Bay Area Economics, 2004).

The *Baltimore Industrial Land Use Analysis* recommends three additional zones to the City zoning code. The first is for industrial parks located on properties of 20 acres or more. These parks would exclude retail uses but include technology and office uses. The industrial park should provide room for on-site parking and truck maneuvers. The second zoning recommendation is an urban business zone that would allow office and technology uses and light manufacturing. See Map 1.

The code should include standards concerning emissions, noise, vibrations, etc. The third zoning recommendation is mixed-use specifically for the Jones Falls Valley area and reuse of other historic industrial properties. The proposed mixed-use zones would allow the location of office, light industry, and residential in the same building or property. Retail uses, unless required for the products manufactured on site, are to be excluded.

Map 1: Baltimore City Enterprise Zones



Source: Baltimore Development Corporation. (2009).

Financial Incentives

According to the Baltimore Development Corporation, the City of Baltimore offers the following financial incentives for industry:

- Low interest loans and bonds (revolving loan funds)
- Baltimore Brownfields Financing Fund
- Brownfields Property Tax Credit
- Enterprise Zone Real Property Tax
- The State of Maryland Enterprise Zone Tax Credit program
- Personal Property Tax Exemption
- Tax Increment Financing (TIF)

The City of Baltimore provides revolving loan funds for the acquisition and enhancement of land, facilities, and equipment. In addition, businesses may use these funds for restoration, demolition, site preparation, new construction, and for working capital. The loans only cover $500,000 or 30-35 percent of a project's cost. Businesses eligible for revolving loan funds include for-profit corporations, partnerships, and proprietorships.

The Baltimore Brownfields Financing Fund aids with cleanup and redevelopment of brownfield sites. The City receives funding for these projects through the EPA Brownfields Revolving Loan Fund, City Bond Funds, and the Maryland Clean Water Revolving Loan Fund. In addition, the City may offer Brownfields Property Tax Credit. Properties eligible for Maryland's Voluntary Cleanup Program may receive a tax credit of 50-75 percent for five or ten years. In addition, the City can grant tax abatement for past taxes

on brownfield property. Through the Baltimore Brownfields Financing Fund, the City has completed over 30 Brownfield projects that resulted in more than 3,000 new or retained jobs and leveraging $300 million in new investments.

The Enterprise Zone Real Property Tax incentive is a ten-year credit against local real property taxes on a portion of real property improvements. For the first five years, the credit is worth 80 percent; it then decreases annually by 10 percent. In the City of Baltimore's Enterprise Zone Focus Areas, the credit remains at 80 percent for ten years (Baltimore Development Corporation, 2008). Businesses located in a Focus Area may be eligible to receive tax credits on personal property. Data obtained from 2007, illustrates the success of Baltimore's Enterprise Zones and the tax credit program offered within these areas. According to the Baltimore Development Corporation's 2007 Annual Report, 40 businesses that created 530 new jobs and retained over 1,831 existing jobs benefited from the tax credits.

The City of Baltimore offers a Personal Property Tax Exemption as a method of encouraging the expansion of manufacturing. In addition to tax credits, the City of Baltimore has authorized the creation of Tax Increment Financing (TIF). TIFs provide funds for the acquisition of public lands, improvement of streets and other infrastructure, pre-development costs, and other permitted costs. A TIF functions by guaranteeing property tax increments gained because of new development within the tax increment district. Bonds are issued based upon the expected increase of real property taxes. The City designates the TIF Development District and the assessable "baseline" of real property located within the district. There are five steps prior to the issuance of bonds. The first step is the development of a TIF plan and proposal by a City coordinating agency. Second, this proposal is presented to the Board of Finance for conceptual approval. Third, the proposed legislative package creating the TIF is presented to the Board of Finance. Fourth, the proposed legislative package is presented to the City Council and the Board of Estimates, if needed. Once the City Council Board and Board of Education approve the package, the final step is to resubmit the documents authorizing the proposed issuance of bonds to the Board of Finance for final approval. As of November 2008, the City had $92.8 million in outstanding TIF bonds (Baltimore City Council, 2008).

Business Assistance and Workforce Development

In addition to financial incentives offered to businesses, the City has created Emerging Technology Centers. These centers consist of two separate incubator facilities (Canton and Johns Hopkins Eastern) and a non-profit business incubator program. The goal of the Emerging Technology Centers is to

promote economic development by providing emerging companies with business, technical, and networking links and resources. In addition to financial incentives and land use policies, the City also offers workforce development. The Mayor's Office of Employment Development offers workforce outreach and recruitment, applicant screening, assessment and testing services, tax credit information and human resources support and training funds (Baltimore Development Corporation, 2008).

Charlotte, North Carolina

Financial Incentives

The City of Charlotte offers several financial incentives for the expansion and retention of industry. These incentives include loans, bonds, and brownfield funds. The Business Investment Program (BIP) encourages creation, retention and/or expansion of new and existing businesses in identified Investment Zones (City of Charlotte, 2009). A three-year grant is provided to companies based on the amount of property tax created by the business investment. Eligible businesses are manufacturing, corporate headquarters, transportation and logistics, emerging technologies and industries, and financial, insurance, and professional services. Businesses applying for BIPs must meet the following criteria:

- A minimum investment of $3 million
- Create a minimum of 20 new jobs
- Pay an average wage rate for all employees at the investment site equal to or greater than 100 percent of the average annual wage rate for the Charlotte-Gastonia-Rock Hill MSA

In addition, manufacturers who create at least 10 new jobs and a minimum investment of $6 million may apply for the program.

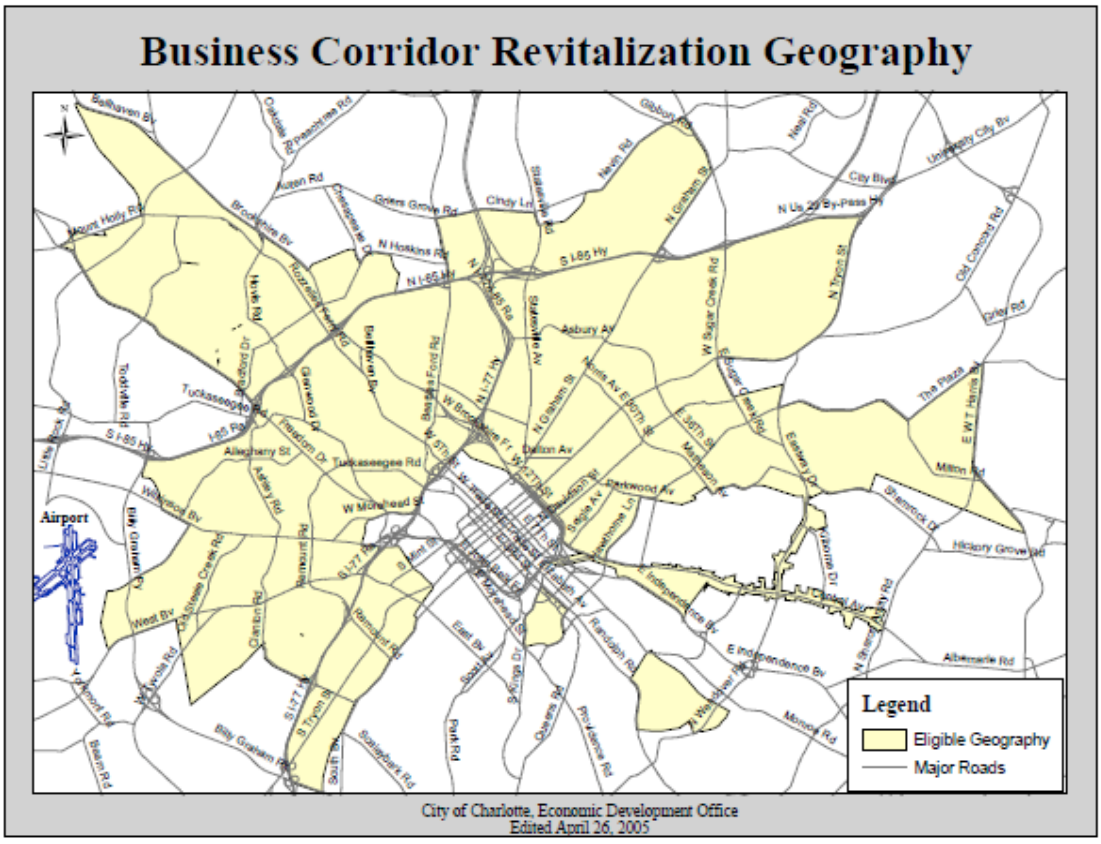
The City also offers Industrial Revenue Bonds (IRB's) as a source of capital for medium-to-large size manufacturing projects falling within the range of $1-10 million in size. Expenses covered under these bonds include land, building and equipment, architectural and engineering fees, interest on construction financing, and issuance costs. Charlotte participates in the State of North Carolina's Urban Progress Zone. This program provides economic incentives for the creation of new jobs and investment in business property in designated Urban Progress Zones. Included among businesses eligible to receive IRB financing are: headquarters, customer service call centers, information technology and services, research and development, and warehousing.

Like Baltimore, Charlotte offers brownfield funds. Its Brownfield Assessment Grant Program provides 50 percent matching funds to property owners for assessment activities at possible brownfield sites. Eligible expenses covered by this grant include: Phase I and II site assessment activities, the design of remediation activities, and legal expenses related to negotiating Brownfield Agreements. Properties eligible for this grant include those that are commercial, industrial, or residential located within the City's Business Revitalization Program Geography. In addition, brownfield property owners who have entered into Brownfield Agreements with the North Carolina Development of Environment and Natural Resources are eligible for city and county property tax exclusions for the first five taxable years.

Land Use Policies

Currently, Charlotte's industrial zoning is labeled either I-1 or I-2. I-2 zoning allows for more flexible uses than I-1. Charlotte also has 5 existing business corridors chosen from a conducted revitalization study (see Map 2). These corridors include the Beatties Ford Road, Rozzelles Ferry Road, Eastland Area, North Tryon, and Wilkinson/Freedom/Moorhead Area (City of Charlotte, 2009). The City of Charlotte is marketing the Rozzelles Ferry as a corridor for manufacturing or distribution businesses.

Map 2: Business Corridors for Charlotte, North Carolina



Source: City of Charlotte. (2009). http://cmsmondo.co.mecklenburg.nc.us

Business Assistance

In addition to land use policies and financial incentives, the City has created a program called BusinessFirst Charlotte that is focused on the retention and expansion of businesses and jobs (City of Charlotte, 2009). Representatives visit businesses to gain a better understanding of needs and expectations, match local resources with specific needs, and identify companies at-risk of relocation or job loss. The City of Charlotte is a member of the Charlotte-Mecklenburg Workforce Development Board. This workforce development board operates local workforce development programs seeking to resolve workforce issues identified by the community.

Chicago, Illinois

The City of Chicago offers many services to attract new businesses and retain existing companies. These services and incentives include:

- Empowerment and Enterprise Zones
- Tax credits
- Loans and bonds
- TIFs
- Brownfield Development funds
- Marketing campaigns
- City funded job-training programs

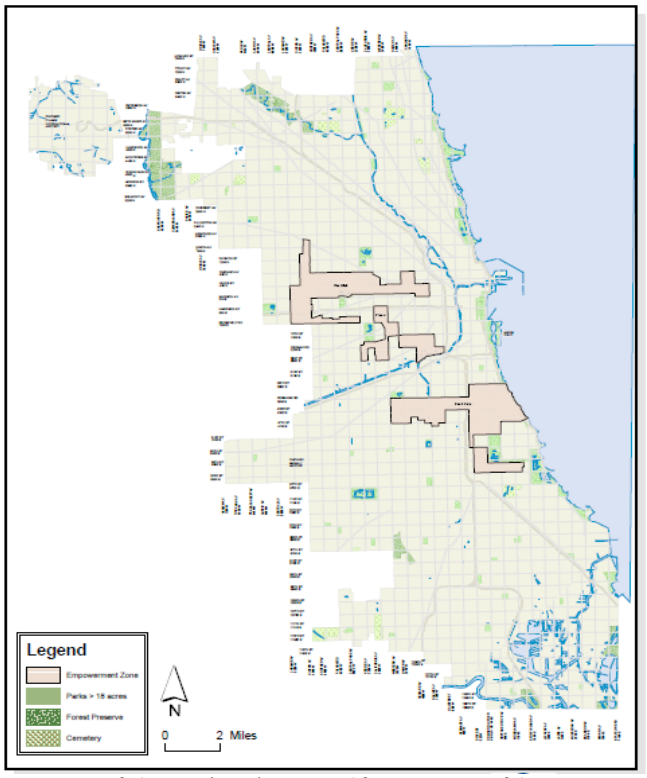
In addition, Chicago adopted a comprehensive industrial land-use policy that designates Planned Manufacturing Districts (PMDs) throughout the City. Chicago's PMDs have served as models for other designated industrial land use in cities across the United States.

Financial Incentives

In Chicago, the Empowerment Zone Program provides federal tax incentives for eligible businesses to encourage investment and the creation of new jobs. These incentives include tax deductions up to $37,500 of the cost to certain zone property in designated Empowerment Zones, companies who expand within the zone may receive tax-exempt bond financing, and employers who hire "high-risk youth" who reside in Empowerment Zones are eligible to receive wage credits up to $2,100 (City of Chicago, 2009). Map 3 illustrates the location of the City's 2004 Empowerment Zones. In addition to the Empowerment Zone Program, Chicago participates in the State of Illinois Enterprise Zone Program. This program offers state and federal incentives to businesses in the process of expansion. Incentives

offered under the Enterprise Zone Program include sales tax exemption, property tax reduction, finance assistance, real estate tax exemption, investment tax credit, state jobs creation credit, machinery and equipment sales tax exemption, and utility tax exemption.

Map 3: Chicago's Empowerment Zones



Source: City of Chicago. (2009). Retrieved from www.CityofChicago.org

In addition to incentives received in the Empowerment and Enterprise Zones, local businesses may be eligible for property tax incentives. These incentives are categorized as Class 6(b), Class 7(a)/(b), Class 8, and Class L. These incentives allow businesses to receive a 12-year reduction in real estate assessment. For the first 10 years, eligible properties are assessed at 16 percent. During the 11th and 12th years, the properties are assessed at 23 and 30 percent. Properties receiving Class 6(b), Class (8), and Class L incentives are eligible to renew their tax reduction for an additional 10 years at 16 percent (City of Chicago, 2009).

Chicago offers several loan and bond programs to qualified industries. One such program is the Industrial Expansion Loan Program that provides improved financing for owner-occupied or multi-tenant industrial projects. Businesses receiving these funds may use the money to build new facilities, expand, or rehabilitate existing facilities. Industrial Expansion Loans offer interest rates 2 to 2.5 percentage points below market rate, loan-to-value ratios may be as high as 95 percent of development costs, and industries may receive partial debt forgiveness. Qualified candidates must be an established business owner or an industrial facilities developer, willing to invest in the construction or rehabilitation of facilities within a designated area, and have real estate financing demands of $2 to $15 million.

The City issues Industrial Revenue Bonds to qualified manufacturing companies to assist with the financing of new construction, building renovation, and acquisition of fixed assets. This program provides tax-exempt, continuing financing at lower interest rates than traditional financing. Enterprise Zone Facility Bonds are available for eligible businesses located in or moving to a federal empowerment zone. Other financial incentives offered by the City include the Laboratory Facilities Fund. These funds

are available to targeted industries involved in nanotechnology, biotechnology, medical devices and services, environmental technology, food technology, pharmaceuticals, and other related technologies. The program funds up to 25 percent of eligible base lab construction cost. In addition, at the completion of the projects the company may receive $1.4 million as a conditional grant.

The City of Chicago offers several types of loans to encourage the growth of small businesses throughout the City. Micro Loans provide up to $20,000 for small businesses unable to obtain funding through traditional methods. Interest rates on Micro Loans are set at 3 percent or the current Federal Reserve discount rate. Eligible businesses can use these funds to finance equipment, machinery, renovation, and unusual working capital requirements. The Small Business Development Fund provides loans to small, high-growth emerging companies with annual revenues below $5 million. These funds are generated through the concession sale of the Chicago Skyway. Businesses may receive from $25,000 to $250,000 in funds; in addition, a fixed rate of prime plus one percent for five to seven years terms is available. Purchase order loans at a variable rate of prime plus five percent up to six-month terms are available.

Like many cities throughout the United States, Chicago has designated TIF districts and specialized funding for cities located within these districts (City of Chicago. Department of Community Development, 2009). In Chicago, TIFs are used to promote investment in blighted sections of the city. These funds are used to construct and restore roads and infrastructure, clean polluted lands, and place vacant properties back into production. Funds are created by growth in the Equalized Assessed Valuation of properties within TIF districts over a period of 23 years. The State of Illinois requires areas proposed for TIF designation to contain numerous types of blight such as age, obsolescence, code violations, disproportionate amount of vacancies, overcrowded facilities, inadequate utilities, lack of physical maintenance, lack of community maintenance, and visible dilapidation or deterioration.

Several types of funds and programs are available for businesses located within TIF districts. The Small Business Improvement Fund Program provided funds for small businesses to make improvements to properties. This program uses TIF revenues to help commercial and industrial property owners to repair or rehabilitate facilities. Eligible participants can receive matching grants to cover half the cost of remodeling work. Grant funds are not to exceed $150,000. The Streamlined-TIF program provides access to grants for the improvement of industrial, commercial, retail or residential mixed-use properties in designated TIF districts. The program includes an easy-to-use application form and

efficient approval process to pay up to 25 percent of renovation, expansion, or redevelopment costs. Grants may range from $25,000 to $1,000,000 and are distributed in annual installments following project completion. Eligible expenses include land acquisition, land clearance, site preparation, certain environmental remediation measures, building rehabilitation and repair, professional fees related to redevelopment, job training and Welfare-to-Work programs.

In 1993, the City of Chicago established the Chicago Brownfield Initiative to acquire, assemble, and rehabilitate properties (City of Chicago. Department of Environment, 2009). The Brownfield Initiative creates jobs and generates tax revenues through industrial redevelopment. The City works with the Department of Environment and other city agencies to study new uses for specific sites, partially fund testing and cleanup, and hold appropriate parties responsible for incurred costs. Brownfield projects are partially financed through funds from the federal Environmental Protection Agency.

Marketing

Chicago conducts a "Made in Chicago" marketing campaign to promote the companies that make up the City's industrial base (City of Chicago. Department of Community Development, 2009). The marketing campaign is a no-cost program for participating manufacturers. Manufacturers are highlighted in a "Made in Chicago" booklet, receive recognition on the City's website, and placed in a Made in Chicago display case located on the McCormick Place Convention Center. Participating business sectors have included amusements, prepared foods, electronics, and packaging/containers.

Workforce Development

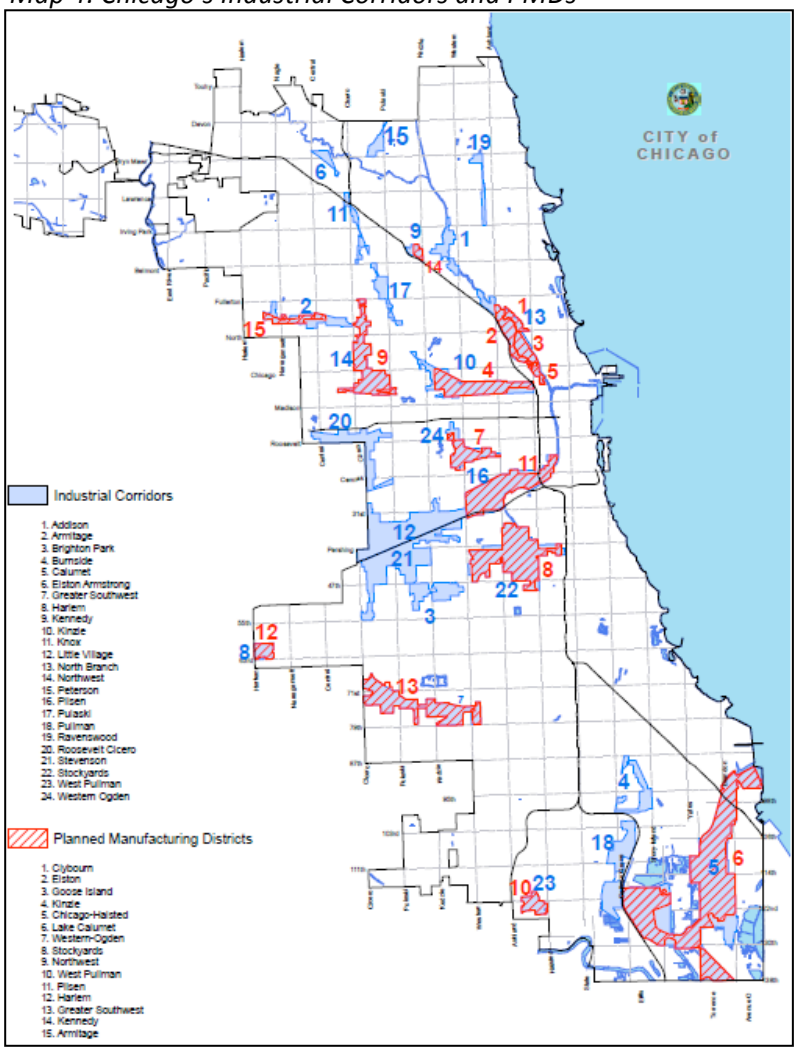
The Mayor's Office of Workforce Development offers several workforce-training programs. The Workforce Center of the Service Industries and the Chicago Workforce Center for Manufacturing address the hiring and workforce needs of individual business sectors (City of Chicago. Department of Community Development, 2009). The Centers provide employers with access to skilled labor aimed at to increase job retention and encouraging career growth among employees. TIFWorks, a program sponsored by the Department of Community Development, encourages business success by funding workforce-training costs for companies located in TIF districts. Types of training funded by this program include negotiation and sales, technology skills, leadership and management, communications and language skills, and training to support new products, machinery, or technology.

Mayor Daley's WorkNet Chicago is a network containing of more than 100 community-based organizations from across the city. This program assists local businesses with finding job-ready employees and helps Chicagoans find, train for, and advance in well-paying jobs. Another workforce program is Workforce Solutions, which helps businesses find, train, and retain employees. This program offers employment-consulting, access to human and financial resources, and employee training. The Chicago Manufacturing and Renaissance Council works with the City Colleges of Chicago to upgrade their manufacturing programs and bring them in line with international best practices.

Land Use Policies

Chicago has an Industrial Corridor Program created to make the City more competitive for industry (City of Chicago Community Development [Planning and Development], 2009). To do this, the program combines company and community interests to plan and implement improvements in dedicated industrial areas. Currently, Chicago has 24 industrial corridors with defined geographic boundaries and unique identities. Corridor plans are developed by local community and business leaders aimed at making each corridor safe, accessible and functional, competitive and marketable, manageable, and attractive. Map 4 illustrates the location of Chicago's Industrial Corridors and Planned Manufacturing Districts. In addition, the program makes resources available to select Local Industrial Retention Initiative (LIRI) organizations to produce, implement, and manage development plans for specific corridors.

Map 4: Chicago's Industrial Corridors and PMDs



Source: City of Chicago. (2009). Retrieved from www.CityofChicago.org

Our review of literature and the City of Chicago website offers limited information regarding Planned Manufacturing Districts. The following information explains the essentials of these districts. In 1988, Chicago created its first Planned Manufacturing Districts (PMDs) (Curry, 2007). These districts now serve as models for industrial zoning throughout the United States. PMDs allow industrial and non-industrial activities compatible with industrial settings and exclude residential use within the area. Noxious industrial uses and uses typically allowed as-of-right in standard manufacturing districts are considered conditional uses and undergo a special permit review. The PMD ordinance includes regulations to establish enclosure restrictions and front and side yard requirements to protect non-industrial neighbors. The goals of PMDs are to increase the City's industrial base, maintain a diversified economy, and encourage industrial investment, modernization and expansion.

Los Angeles, California

The City of Los Angeles experienced low vacancy rates in industrial lands over the past 10 years. While the City has formulated plans detailing the need for industrial land protection, it has have delayed any actions to remedy the situation.

Land Use

An Industrial Land Use Policy plan was prepared for the city in 2006. Although the recommendations from the ILUP have yet to be implemented, the city of Los Angeles is working to curb the decline of industrial lands by:

- Providing long and short term directions for protection of Industrial Land
- Identifying where industrial uses and zoning should be maintained
- Identifying community benefits to mitigate industrial loss, and
- Identifying the need for new land use zoning categories to decrease the loss of industrial land. (Los Angeles Industrial Land: Sustaining a Dynamic City Economy, 2007)

On January 3, 2008, the Department of Planning for the City of Los Angeles committed to implementing the recommendations of the plan through a memo issued from the director of planning, S. Gail Goldberg.

The memo focuses on:

- Recommending employment protection districts that encourage industrial uses and discourages residential uses
- Promoting industrial mixed-use districts that mix industrial and employment district and encourage limited residential uses
- Encouraging transition districts where conversions have already taken place, but can still house some industrial uses
- Identifying correction areas where zoning was changed but should go back to industrial settings (Los Angeles Department of City Planning, 2008)

Financial Incentives

In addition to a potential land use policy for the protection of industrial lands, the City of Los Angeles also offers some innovative financial incentives to targeted manufacturers. These tax credits and loans offer incentives for areas found within State Enterprise Zones as well as Federal Empowerment Zones and Renewal Community Areas.(Los Angeles Business Solutions, 2008). Some examples include:
Discounted Electricity Rate: Discounted electricity rates offer reduction of base electric rates over course of 60 months. Commercial and industrial customers who are newly located in a State Enterprise Zone (SEZ), Federal Empowerment Zone (FEZ), or Renewal Community (RC) are eligible for a reduction on the base electric rate.

Employer Hiring Credits: These credits are for up to $35,100 over a 5-year period per each qualified employee and can be claimed by an Enterprise Zone business as a tax credit. Businesses located in a State Enterprise Zone (SEZ) are eligible.

Renewal Community Tax Credit: Renewal community tax credits allow businesses to take an annual tax credit of up to $1,500 for each employee who lives and works for the business in a Renewal Community. Businesses located in a Renewal Community (RC) are eligible.

Recycling Market Development Zone: This program provides direct loans to eligible businesses and non-profit organizations that manufacture from recycled raw materials, produce new recycled products, or that reduce waste resulting from manufacturing. These loans promote market development of post-consumer and secondary waste materials. Business located in the City of Los Angeles that manufacture

from recycled raw materials, produce new recycled products, or that reduce waste resulting from manufacturing are eligible.

Minneapolis, Minnesota

Minneapolis has three main strategies to address the loss of industrial lands and employment to the surrounding suburbs: 1) focus and highlight its skilled work force and their educational attributes and 2) manipulate land uses to create employment districts where industries and manufacturers can thrive and 3) provide financial incentives for local businesses (City of Minneapolis, *Industrial Land Use Study and Employment Policy Plan*, 2006).

Workforce Development

Minneapolis conducted work force studies that evaluated the current age, educational level, and median income of the population surrounding industrial clusters. The City used the tools provided by the State of Minnesota to match the talents of its workforce to targeted manufacturers. Among these tools are:

Minnesota Job Bank: Posts open positions and active resumes for job seekers and employers alike. It also highlights green jobs to further the attraction of job seekers in this field as well as potential manufacturers.

ISEEK: This program focuses on helping the workforce make smart choices about careers, employment, education, and training.

Job-Skill Analysis Services: The Department of Employment and Economic Development offers this program to help employers build and maintain a high performance workforce.

Job Skill Partnership Program: The Minnesota Jobs Skills Partnership (MJSP) Program strategically helps Minnesota businesses and schools competitively train the workforce. Grants are awarded by the Minnesota Job Skills Partnership Board to educational institutions that partner with businesses to develop new-job training or retraining for existing employees. All training projects pair at least one public/private accredited Minnesota educational institution and one business. Funds may be used for training-related costs or educational infrastructure improvements necessary to support businesses

located or intending to locate in Minnesota. A cash or in-kind contribution from the contributing business must match program funds on at least a one-to-one ratio.

Minnesota State Colleges and Universities Business and Industry Services: This program is a union between colleges and universities that seek to further the training of persons looking to acquire skills in business and industry (City of Minneapolis Community Planning and Economic Development, 2009).

Financial Incentives

The city also offers financial incentives for industries looking to relocate. The Department of Employment and Economic Development offers a wide array of financing programs, such as bonds, loans, and alternative financing, ranging from $1,000 to $10 million, depending upon the program (City of Minneapolis Community Planning and Economic Development, 2009). The city also provides a staff that helps market these incentives and matches programs to targeted industries. The following are some of the programs offered by the city:

Business Development Fund Loans: Loans are available to redevelopment projects that have job creation potential. Businesses located within the city limits of Minneapolis, or, moving into Minneapolis, may apply. BDF loans are targeted at companies that will provide full-time jobs paying $12 to $16 per hour plus benefits. Most participating BDF businesses have at least 20 employees and expect to add 10 jobs within the first three years of the loan.

BDF loans cannot exceed $75,000 or 50 percent of total project costs, whichever is less.
BDF loan funds may be used for:

- Inventory
- Production equipment
- Acquisition of business assets
- Move-In costs
- Leasehold improvements
- Real estate or building expansion

Revenue Bonds: These bonds are available to finance industrial, commercial and medical facilities, multifamily rental housing, nursing homes and some nonprofit activities. Businesses that use financial incentives from the city may be asked to sign Job Linkage Agreements. Job Linkage agreements

encourage businesses to establish five-year job hiring and retention goals, employ local residents, and pay living wages. An integral part of this agreement involves a partnership between the business and neighborhood workforce development organization to assist in identifying, training, and placing new employees.

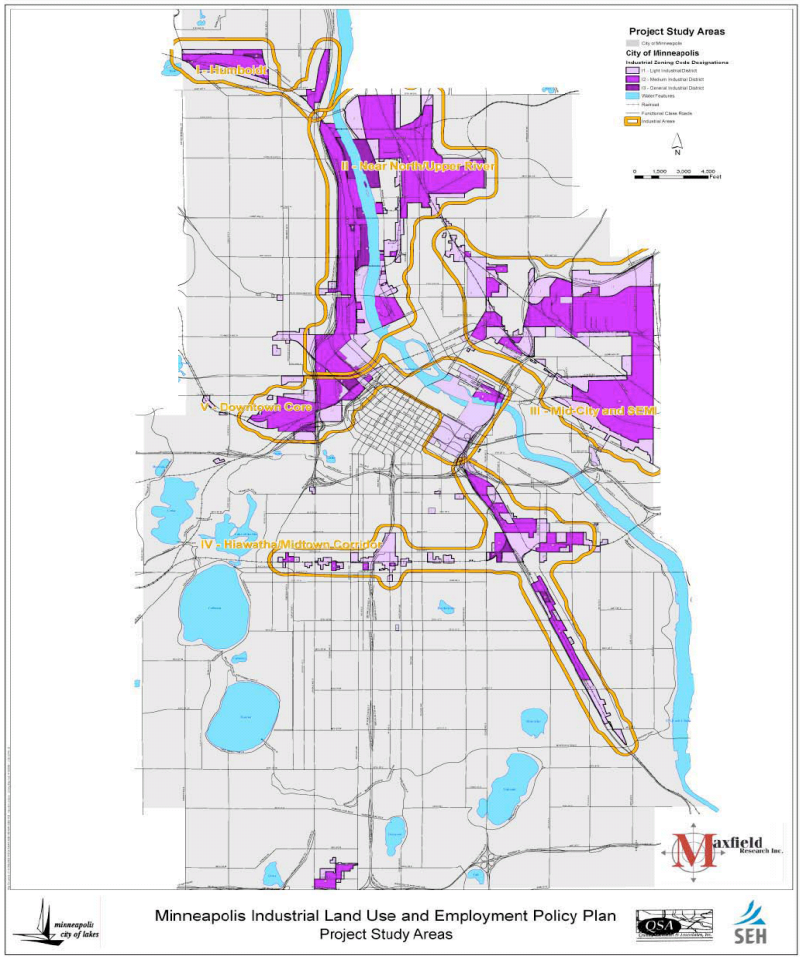
Land Use Policies

The city of Minneapolis recently adopted recommended land use recommendations for retaining industrial jobs in the city. In 2006, the City Council approved recommendations resulting from a yearlong industrial and employment study. This plan, known as the *Industrial Land Use Study and Employment Policy Plan,* included information and input from a citizen and city council steering committee and neighborhood meetings. The recommendations are in the process of being implemented and some research will have to be conducted by the authors to find out exact time lines (City of Minneapolis, 2006). Two notable recommendations are:

Define Industrial Business Park Opportunity Areas, (identified in the plan as Option #2) – This recommendation seeks to define the boundaries for industrial businesses. It also seeks to designate Industrial Business Park Opportunity Areas as districts rather than points, or nodes, which lack a clearly defined boundary. This lack of boundary decreases protection of industrial lands; therefore, Minneapolis seeks to establish districts with clear boundaries. "Specific geographic boundaries will clarify that industrial is the priority land use and uses that impede industrial businesses should not be permitted" (*Industrial Land Use and Employment Policy Plan for the City of Minneapolis,* 2006). *The* proposed boundaries will designate 2,193 acres for continued industrial use, which is 55% of the City's industrial acreage and 70% of industrial used land as of 2004. Map 5 illustrates the areas considered for industrial conservation.

Map 5: Minneapolis Industrial Land Use Project Study Areas

The second recommendation is to adopt citywide criteria when evaluating rezoning recommendations. In Section 525.280 of the Minneapolis Zoning Code, the planning commission is required to make findings on five issues, including comprehensive plan compliance, whether the amendment would be in the public interest, compatibility with adjacent uses, whether the existing use is reasonable, and any transitions that have occurred in the character of the general area. Also to be considered are job impacts, tax base impacts, transitioning costs, and adjacency to viable industrial areas.



City of Minneapolis. (2006). Industrial Land Use Study and Employment Policy Plan Redevelopment Analysis.

Although Option Two was important, the creators of the plan highly recommended option three: *Adopt Employment Districts;* prohibit rezoning amendments for residential uses in Employment Districts. Option Three is a stricter version of Option Two as it also clearly defines boundaries of Industrial Business Park Opportunity Areas by adopting Employment Districts. This option prohibits residential uses, industrial living, and calls for an overlay of already established employment districts with Industrial Business Park Opportunity Areas. Option Three also recommends guidelines for evaluating rezoning amendments in areas outside of the Employment Districts.

New York City, New York

The New York Economic Development Corporation (NYEDC) seeks to foster economic growth and create programs to assist businesses and business sectors. According to the NYEDC mission statement, "Our work helps create jobs, positions New York City for future growth while improving the quality of life. We make the City stronger" (New York Economic Development Corporation, 2009). To strengthen and expand the industrial sector, the City of New York offers financial incentives, business assistance, workforce development, and has distinct land use policies.

Financial Incentives

Financial incentives in the City of New York include tax exemptions and credits, revolving funds, and other incentives. Examples of tax exemptions and credits include the following:

Commercial Expansion Program (CEP): The Commercial Expansion Program (CEP) provides real estate tax abatement for new, renewal, or expansion leases for commercial office or industrial space in Manhattan north of 96th Street or in Brooklyn, Queens, the Bronx, or Staten Island. Eligible buildings must have been built prior to January 1, 1999 and contain at least 25,000 square feet. In addition, leasehold expenditures for improvements should be at least $2.50/square foot for leases less than 10 years and renewal leases of 10 years or more, $5.00/square foot for renewal leases of 10 years or more involving only previously occupied space, and $25/square foot for new and expansion leases of 10 years or more. Minimum lease terms must be at least 3 years if 125 employees or less are on the premises or 10 years if more than 125 employees are on the premises. The lease must start by June 30, 2010 and provide that any abatement of real estate taxes will be passed to the tenant and require leasehold expenditures will be made (New York City Economic Development Corporation, 2009).

Industrial and Commercial Abatement Program (ICAP): This program provides abatements of real property taxes for varying periods up to 25 years for renovation or construction.

Relocation and Employment Assistance Program (REAP): This program provides a tax credit for businesses that relocate from outside New York City or from Manhattan below or above 96th Street or in Brooklyn, Queens, the Bronx, or Staten Island.

Other financial incentives offered by the City include discounted energy programs. The following are examples of these programs:

Business Incentive Rate (BIR): An energy discount program co-administered by EDC and Con Edison. The program offers a discount off Con Edison's delivery charge to businesses in the manufacturing and industrial sectors. Con Edison directly provides the electricity discount to eligible businesses under this program. EDC processes and tracks the paperwork and performs Account Management and Compliance functions.

Con-Ed Gas Manufacturing Incentive Rate (MIR): This program offers special reduced gas rates to manufacturers. Eligible manufacturers that occupy new or vacant buildings, or negotiate a comprehensive package of incentives from the State or local authorities may qualify.

Con-Ed Empire Zone Gas Rate: Offers commercial and industrial customers a special program of reduced gas rates. Businesses must start, relocate or expand in a designated New York State Empire Zone.

Sales Tax Exemption for Manufacturers: Businesses located in New York City are entitled to an exemption for the eight and one-quarter percent city and state sales tax on electricity, fuel oil, natural gas, and steam used for manufacturing, processing, assembling of tangible personal property for sale.

Reclaiming Sales Tax Previously Paid: Manufacturers that have paid taxes on energy purchases are eligible to apply for a rebate of over paid taxes. Interested businesses must submit an application for credit or refund of sales or use tax must to the New York State Department of Taxation and Finance. The business must explain the reasons for previously overpaid taxes. Refunds are available for taxes paid within the last three years.

The following are examples of incentives offered by the New York Industrial Development Agency (NYIDA):

Recover NYC Program: This program provides financial assistance to private-sector to for-profit companies seeking lower-cost financing for shovel-ready construction projects. Assistance is available in the form of access to triple tax-exempt bond financing authorized by the American Recovery and Reinvestment Act of 2009.

Manufacturing Facilities Bond Program: Manufacturers of tangible personal property acquiring, developing, renovating or equipping facilities for their own use can access triple tax-exempt bond financing and real estate, mortgage, and sales tax reduction.

Not-For-Profit Bond Program: 501(c)(3) not-for-profit organizations purchasing, developing, renovating or equipping facilities for their own use can access triple tax-exempt financing and mortgage recording tax reductions. Pooled bond structures to reduce costs are also available.

Exempt Facilities Bond Program: Companies developing facilities on publicly-owned docks and wharves or developing solid waste recycling facilities can access triple tax-exempt bond financing. Reductions in mortgage recording and sales taxes may also be available.

Empowerment Zone Facilities Bond Program: Developers of commercial, industrial or retail facilities, as well as other types of facilities within the areas of Upper Manhattan and the South Bronx designated as the Empowerment Zone, can access triple tax-exempt bond financing. Reductions in mortgage recording and sales taxes may also be available. Borrowers must commit to employ Empowerment Zone residents to be eligible for the program.

Industrial Incentive Programs: The Small Industry Incentive Program (SIIP) and Industrial Incentive Program (IIP) provide eligible industrial companies with real estate tax reductions, mortgage recording tax waivers and sales tax exemptions on purchases of materials used to construct, renovate or equip facilities.

Business Assistance and Workforce Development: New York City provides the following grants and assistance for industrial job training:

- In 2007, the Department of Small Business Services (SBS) created the NYC Business Solutions Training Funds to help industrial businesses enhance the skills of new or existing employees. Businesses may receive up to $400,000. These grants cover up to 60-70 percent of training costs and SBS will work directly with businesses to design programs tailored to meet their specific needs (NYC Business Solutions, 2009). Both small and large employers are eligible for grants.

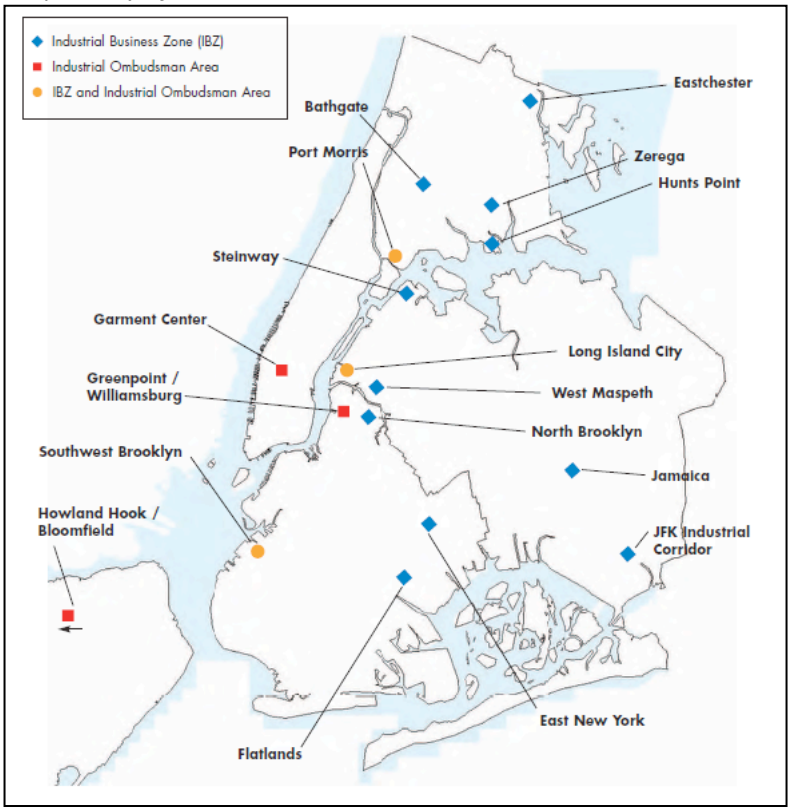
- SBS provides technical assistance to industrial businesses eligible for the Building Skills in New York State (BUSINYS) and Skilled Manufacturing Resource Training (SMART) grant programs, which allow businesses to train existing employees and modernize production processes. BUSINYS grants provide up to $100,000 for training incumbent workers in skills that lead to career growth and increased wages. SMART grants provide up to $50,000 to small and medium-sized manufacturing firms (Mayor's Office of Industrial and Manufacturing Businesses, 2009). The grants may be used to fund training geared towards process or productivity improvements.

Land Use Polices

New York City has created several districts tailored to industrial and manufacturing. These districts include the New York Empire State Zones, Industrial Business Zones (IBZs), New York Empowerment Zones (EZ), and Central Business Districts (CBD). The New York State Empire Zones are designated areas created by the State. The purpose of Empire Zones is to encourage economic growth using State incentives and benefits to new and expanding retail, commercial, and industrial firms. New York City has eleven empire zones located in the Bronx (Hunts Point and Port Morris), Brooklyn (East Brooklyn, North Brooklyn/Brooklyn Navy Yard, and Southwest Brooklyn), Manhattan (Chinatown and East Harlem), Queens (Far Rockaway and South Jamaica), and Staten Island (North Shore and West Shore).

Industrial Business Zones (IBZs) are patterned after Chicago's Planned Manufacturing Districts. IBZs build upon the existing In-Place Industrial Parks and represent areas where the City will provide extensive assistance services to industrial firms. When locating IBZs the City will consider the area's existing land use, the neighborhood's industrial character, no as-of-right zoning for new residential development, traffic patterns, and Empire Zone boundaries. Map 6 illustrates the locations of New York City's IBZs and Ombudsman Areas. Residential use is prohibited in existing and proposed IBZs. Some IBZs include adjacent Industrial Ombudsman Areas that include uses other than industrial. Ombudsman areas are ineligible for tax credits and are not limited by prohibited zoning.

Map 6: City of New York's IBZs and Ombudsman Areas



Source: New York City. (2005). *Protecting and Growing New York City's Industrial Job Base.*

Businesses that relocate to an IBZ may receive a one-time tax credit to cover eligible relocation expenses of up to a $1,000 for every industrial job relocated. In addition to this tax credit, each IBZ is served by a New York City Business Solutions Center (BSC) with dedicated counselors for industrial businesses (www.NYC.gov, 2009). BSC counselors have access to training, material and customer service systems maintained by SBS. The counselors help companies access incentives, comply with regulations, and take advantage of business opportunities (City of New York, 2005).

In 1996, New York created the New York Empowerment Zone (EZ) to help revive industry in Upper Manhattan and the South Bronx. The EZ uses public funds and tax incentives to promote private investment. Businesses located in the EZ may be eligible for a wage tax credit, accelerated depreciation, tax credits, and tax-exempt bond financing (New York Business Solutions, 2009). Businesses in the Upper Manhattan EZ can participate in programs administered by the Business Resource and Investment Service Center (BRISC). BRISC provides technical advice, financing, and entrepreneurial assistance. Businesses in the Bronx EZ may receive financing in return for their commitment to hire local residents. Within each EZ, programs are available to fund real estate purchases and improvements, equipment and machinery, and working capital.

One of the best policy tools created by the City of New York is the Industrial Business Zones. According to the Pratt Center for Community Development, "The Industrial Business Zones are a kind of haven for manufacturing space in New York City because Mayor Bloomberg has promised to keep them zoned for manufacturing and is incentivizing businesses to locate within them" (Pratt Center for Community Development, 2009). Unfortunately, the current designated IBZs include less than half of the City's

manufacturing zoned acres. To strengthen the IBZs, New York will need to exclude certain industries, such as hotels, big-box retail store, and large office buildings. In addition, the City will need to legally prohibit the future rezoning of all IBZs.

Portland, Oregon

The City of Portland has a commitment to encourage business and manufacturing in the city through dedicated retention services as well as innovative land use practices. Most of the financial incentives provided by the city are through the Portland Development Commission as well as the state of Oregon. The PDC helps existing and new business navigate a wide variety of public and non-profit resources. It also helps evaluate Portland as a potential destination for manufacturers. The city also matches business owners with financial and technical resources to give companies a competitive edge. The PDC reaches these goals through several programs.

Retention and Expansion

Portland's business retention and expansion plan provides the following services:

- Assist firms using PDC loans, labor force systems, SBA, state and local financial and real estate resources
- Provide networking opportunities for firms to work together to solve common problems, and to access industry, neighborhood, and business associations
- Assist firms in solving local problems: permits, zoning, marketing, and infrastructure
- Provide current business statistics on economic diversity, transportation systems; population and income; labor force and employment; business, land and building costs; tax structure; health and education facilities; and climate and livability.

The Business Retention and Expansion team provides assistance to hundreds of businesses annually. For example, PDC contacted 500 local and regional businesses in 2007 to address issues they viewed as important and to provide tailored help to those businesses. They also provided loans to 63 businesses totaling $9.8 million, which leveraged $55.6 million in private investment. (City of Portland Bureau of Planning, 2004)

Workforce Development

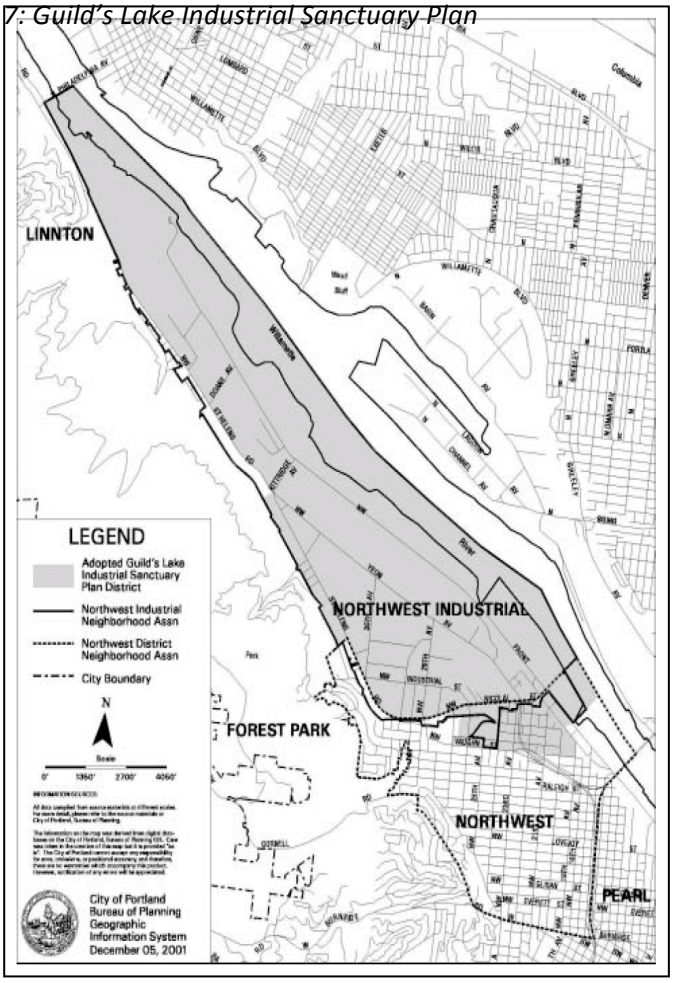
In addition, PDC offers employers a single point of contact for recruiting and training a skilled workforce, in partnership with Worksystems, Inc., community colleges, higher education and workforce training organizations. PDC offers the following services at no cost to the employer:

- Applicant pool of 20,000 Job Seekers
- Tax Credits of $8,500 per qualifying hire
- Grants for existing worker training
- Business Specialists skilled at recruitment, retention and labor market information
- On-line candidate searching www.employment.oregon.gov/ and www.connect2jobs.org

The PDC also offers business location services, site selection and recruitment at no cost to the employer. The agency will prepare individual site selection studies that provide detailed description and analysis of the area and address issues and concerns specific to the company. In addition, they provide statistical information for the Portland area on:

- Economic diversity
- Transportation systems
- Population and income
- Labor force and employment
- Business, land and building costs
- Tax structure
- Health and education facilities
- Climate and livability

Map 7: Guild's Lake Industrial Sanctuary Plan



Source: Guild's Lake Industrial Sanctuary Plan. Retrieved from

Land Use Policies

Portland also protects its industrial areas through the control of land use zoning practices and industrial land sanctuaries. The land use sanctuaries are specific to the particular area and create policies, objectives and implementation strategies to respond to unique characteristics. For example, the Guild's Lake Industrial Sanctuary Plan is 1,625 acres in size and includes 220 acres devoted to rights of way for transportation interactions. Eighty-nine percent of the area is devoted to industrial uses but other uses include railroad lines, utility corridors and radio transmission facilities. Commercial uses are limited to two percent of the total area. These other uses were "grandfathered in" and allow for a small diversity of uses within the industrial sanctuary. Map 7 provides detailed information on the Guild's Lake Industrial Sanctuary. In addition, other policy measures have been taken to further protect industrial lands. To enhance the industrial sanctuaries, the Bureau of Planning recommends the following:

- Prohibit applicant initiated (quasi-judicial) Comprehensive Plan map amendments in Prime Industrial Areas.
- Additional code amendments for other industrial and employment lands to further limit the amount of retail and office space allowed in industrial zones.

The City of Portland uses creative methods to attract and retain its industrial base. Like Seattle, the city offers an array of business services to its local business and insures that lands are preserve where they can prosper without much encroachment.

San Jose, California

San Jose, home to Silicon Valley, offers several financial incentives, workforce development programs, entrepreneur assistance, and land use polices to preserve and promote its industrial base. Unlike most case study cities, San Jose offers limited financial incentives. These incentives include tax incentives, Enterprise Zones, and bonds.

Financial Incentives

Business Cooperation Program: A mutual agreement between local corporations and the City. In exchange for undertaking a tax liability and report to the State of California, San Jose will refund up to 30 percent of the local collected tax. Industrial development bonds are available for job-generating manufacturers. Manufacturers may be eligible for $500,000 to $10 million in local financing and state and federal tax exemptions for loans below commercial market rates. Manufacturers who use recycled feedstock (glass, paper, plastic, used tires, etc.) may apply for low-interest state loans of up to $2 million, as well as technical, marketing and location assistance. (City of San Jose Department of Planning, Building, and Code Enforcement, 2009)

Other tax incentives are available to businesses located in San Jose's Enterprise Zone. These incentives include sales and use tax credit, hiring tax credit, business expense deduction, and net operating loss carryover. Purchases of machinery and equipment by businesses within the Enterprise Zone are eligible for a 9.25 percent tax credit on state income tax. Corporations may claim a credit equal to the sales and use tax paid or incurred on the first $20 million cost of equipment. Hiring tax credits are applicable to businesses who hire employees from specific categories. These businesses may claim tax credits on wages paid to employees for five years. For the first year, businesses may claim a 50 percent hiring credit. Business expense deductions of up to $20,000 are available for specific tangible property used in the Enterprise Zone. The net operating loss carryover allows 100 percent of the net operating loss to be carried over up to 15 years. The net operating loss carryover reduces the amount of taxable income levels paid in following years.

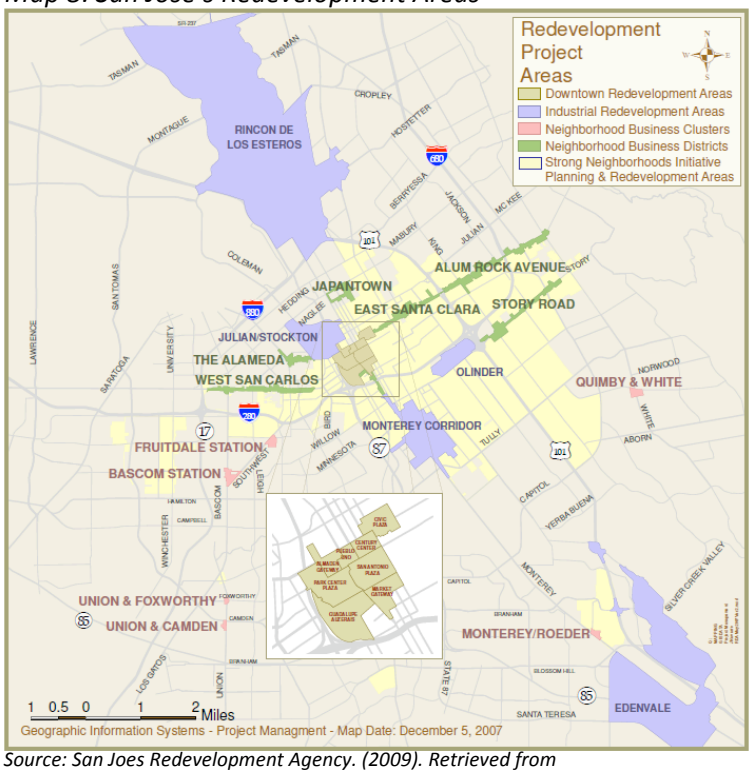
Entrepreneur Assistance

The City of San Jose supports the efforts of entrepreneurs using business incubators, business clusters, and small business development programs. Business clusters include the Environment Business Cluster (EBC) and Software Business Cluster (SBC). The EBC offers assistance to manufacturers of environmental products or providers of environmental services. The SBC provides emerging software companies with mentoring, funding, and networking opportunities. In addition, the SBC assists with business plan refinement, development of marketing plans, investor and customer presentations, office space, internet access, and website and e-mail hosting. Small business development programs include the BusinessOwnerSpace.com (BOS), a one-stop resource for launching and growing a business. BOS is supported by a collaborative partnership among public, private, and non-profit agencies and businesses. The Entrepreneur Center (eCenter) provides entrepreneurs with finance programs, technical assistance, management training, assistance with procurement programs, technology training, and international trade counseling. The eCenter collaborates with the U.S. Small Business Administration, Cisco Systems, the City of San Jose, and community business organizations. The Silicon Valley Small Business Development Center assists small businesses with opportunities, prevention of future problems, improvement of management skills, business expansion and development, and the promotion of minority and women-owned businesses. The Work2Future-Business Services Program provides small businesses with workforce tools needed to succeed in a global economy.

Land Use Policies

Located within the City of San Jose are various industrial land uses. These uses include the Industrial Redevelopment Project Areas, an innovation triangle, and technology park. San Jose has five Industrial Redevelopment Project Areas scattered throughout the City (San Jose Redevelopment Agency, 2009). Map 8 illustrates the City of San Jose's Redevelopment Project Areas. These areas cover 7,843 acres of developed

Map 8: San Jose's Redevelopment Areas



Source: San Joes Redevelopment Agency. (2009). Retrieved from www.sjredevelopment.org/industrial.htm

and undeveloped privately owned land. The investment of these properties by the San Jose Redevelopment Agency has created 70 million square feet of R&D, office, manufacturing, and warehouse spaces, as well as over 80,000 jobs in a 30-year period. The Innovation Triangle includes 42 million square feet of office/industrial space. Major employers in this area include Cisco, Texas Instruments, Sony, Canon, Philips, Lockheed Martin, etc. The Edenvale Technology Park is home to several life science and clean technologies corporations. This park has over 300 companies that employ over 13,400 people. The technology park is home to the San Jose BioCenter, a life science research facility and business incubator sponsored by the Redevelopment Agency.

Seattle, Washington

The City of Seattle has stated its commitment to promoting and protecting its industrial land use base. Many of the City's incentives and land use policies are used to further the State of Washington's comprehensive goals. Seattle and the State of Washington are committed to the following goals found in the *Seattle's Industrial Land—Mayor's Recommendations*:

- **Urban Growth:** Encourage development in urban areas where adequate public facilities and services exist or can be provided in an efficient manner.
- **Reduce Sprawl:** Reduce the inappropriate conversion of undeveloped land into sprawling, low-density development.
- **Transportation:** Encourage efficient multimodal transportation systems that are based on regional priorities and coordinated with county and city comprehensive plans.
- **Economic Development:** Encourage economic development throughout the state that is consistent with adopted comprehensive plans, promote economic opportunity for all citizens of this state, especially for unemployed and for disadvantaged persons, promote the retention and expansion of existing businesses and recruitment of new businesses, recognize regional differences impacting economic development opportunities, and encourage growth in areas experiencing insufficient economic growth, all within the capacities of the state's natural resources, public services and public facilities.
- **Environment:** Protect the environment and enhance the state's high quality of life, including air and water quality, and the availability of water.

Financial Incentives

Seattle, with the help of the State of Washington, offers several tax exemption and deduction programs to foster industrial development. A number of the offered incentives are specifically targeted to green industrial sectors. The following are examples of financial incentives:

Machinery and Equipment Sales and Use Tax Exemption: Eligible businesses include manufacturers and processors specializing in manufacturing and R&D, as well as, testing operation for manufacturing and processor for hire. This tax exemption is used to purchase qualifying machinery and equipment needed for manufacturing, research and development, or testing operations.

B&O Tax Exemption for Manufacturers of Fresh Fruit and Vegetables: This tax exemption promotes food-processing operations within the City. Businesses specializing in canning, preserving, freezing, processing, or dehydration of fresh produce are eligible for this tax exemption.

B&O Tax Exemption for Dairy and Seafood: An incentive used to promote edible products. To qualify for this tax exemption, the buyer must transport manufacturing and wholesale sales of dairy and seafood products out of state on a regular basis.

Reduced B&O Tax Rate for Manufacturing E85 Motor Fuel and Wood Biomass Fuel: This incentive is applicable for businesses who manufacture E85 or wood biomass fuel.

B&O Tax Deduction for Sales of Biofuels: This program offers a tax deduction to retail sellers and distributers of biodiesel fuel and E85 motor fuel.

Solar Energy System and Components of Solar Energy Systems Manufacturers – Reduced B&O Tax Rate: This incentive is offered to manufacturers and businesses that sell their product at wholesale, as well as processors for hire of solar energy systems and specialized parts of solar energy systems using photovoltaic modules. Eligible businesses receive a reduced B&O tax rate of .275%.

Energy Efficient Commercial Equipment – B&O Tax Credit for Purchases: This tax credit is available to businesses with a gross income of less than $750,000. Qualifying commercial equipment purchases must be made between July 1, 2008 and June 30, 2010.

As stated above, the City of Seattle's Office of Economic Development (EOD) offers a wide array of financial incentives to attract and retain businesses. A strong relationship between the State of Washington and the City of Seattle makes many of these financial incentives possible. "The City of Seattle prioritizes long-term economic development planning that promotes job growth, attracts new business, and helps existing businesses expand and grow profitably. To support the efforts of EOD, Washington State offers a number of flexible business incentive programs and these programs include a variety of industries, including aerospace, renewable energy, high technology, and more" (City of Seattle, 2009).

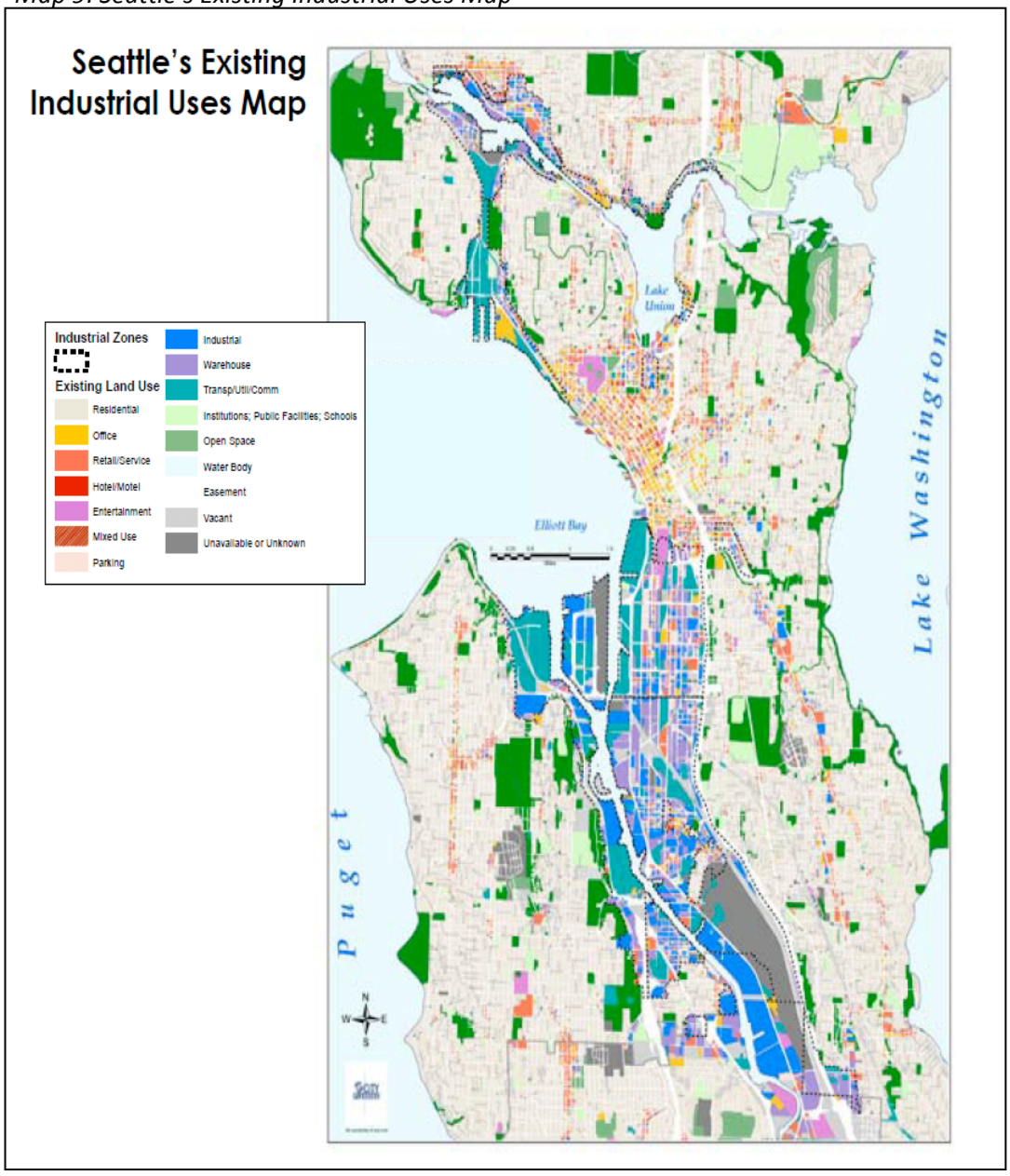
Land Use Policies

Seattle has four established general industrial zones that include density and size limits on office and retail uses and residential uses are prohibited in nearly all zones (City of Seattle's Department of Planning and Development, 2006). The industrial zones are classified as General Industrial 1 (IG1) and General Industrial 2 (IG2). Zones coded as IG1 protect marine and rail-related industrial areas from inappropriate retail and commercial uses through the use of density or size limits. Acceptable uses in these zones include general and heavy manufacturing, limited commercial uses, institutional uses in existing buildings, entertainment uses, transportation and utility services, and salvage and recycling businesses. Zones coded IG2 allow a range of uses where the industrial function of a zone is less established than IG1 areas, and where additional commercial activity can better employment opportunities and physical condition of the area. The City of Seattle allows land uses similar to IG1 in IG2 zones.

In addition to IG1 and IG2 industrial zones, the City supports the existing Industrial Commercial zone (IC). This zone incorporates a mix of industrial and commercial activities, including light manufacturing and research and development. Acceptable land uses include light and general manufacturing, commercial uses, transportation facilities, entertainment, institutions in existing buildings, utilities, and salvage and recycling uses. Additional regulations and restrictions are required for setbacks, screening and landscaping, access to parking and loading, major odor sources, and light and glare. Seattle's industrial land use is not limited to IG1 zones, IG2 zones, and the IC zone. Seattle created an Industrial

Buffer zone (IB). The IB zone provides a suitable transition between industrial areas and adjacent residential zones or commercial zones with residential and/or pedestrian character. Uses allowed in the IB zone include light and general manufacturing, limited commercial uses, some transportation services, entertainment uses, institutions in existing buildings, and salvage and recycling uses. Map 9 illustrates the industrial lands Seattle seeks to protect.

Map 9: Seattle's Existing Industrial Uses Map



Source: Seattle Planning Commission. (2007). The Future of Seattle's Industrial Lands.

Business Assistance and Retention Tools

In 1998, volunteers formed the Manufacturing Industrial Council of Seattle (MIC) to advocate for local businesses. The MIC and the Duwamish Transportation Management Association actively engage with local, regional, and state policy makers on government policies and practices that impact industrial firms. The MIC provides information and outreach through its magazine, *Seattle Industry*, and the website Seattle Industry Online (www.seattleindustry.org). Another example of business assistance is the Seattle First program. Seattle First's goal is to retain and strengthen Seattle's Industrial Community. This program provides problem-solving services for industrial businesses in regards to governmental regulations or relocations. In addition, Seattle First provides information on free and low cost services available to Seattle industrial firms, such as state tax incentives, international marketing resources, low cost capital investment loans for industrial users, Lean Manufacturing services, reduced cost customized force training, and work place English training.

Vancouver, British Columbia

Our research of Vancouver, British Columbia uncovered no existing financing tools specifically for industrial development. Vancouver has created land use policies to guide the development of local businesses. Vancouver has stated its belief that new development should assist the financing of City growth (City of Vancouver's Community Services Planning, 2009). The following principles guide the creation of financing tools to assist the cost of growth due to new development:

- Community livability should be maintained as the City grows
- New development should contribute to paying for its growth costs and impacts
- The costs of City facilities and services should be shared fairly among new and existing development, and among various types of developments
- The economic impact of charges should not discourage development or reduce housing affordability
- The system should be citywide, predictable, simple so developers can foresee requirements and communities can expect developments to provide for appropriate local needs
- There should be consistency among financing growth policies and other City policies
- Provide flexibility where necessary (e.g., rezoning with special opportunities)
- Input from community members

Using the previously listed principles the City created financing tools. These tools include Development Cost Levy (DCL) and Community Amenity Contribution (CAC). The DCL is a charge on all new developments. The monies generated from this levy help to pay for parks, transportation facilities, childcare, and social/non-profit housing. The rate depends on the type of development. Residential development up to 1.2 FSR is charged $1.72/square foot, residential development over 1.2 FSR, commercial or other uses are charged $6.00/square foot, and industrial zoned developments are charged $3.40/square foot. The CAC is a monetary or in-kind contribution charge on additional density that has been approved by the City Council through rezoning. For standard rezoning, the CAC is $3.00/square foot on additional density. Non-standard rezoning has a negotiated CAC.

Land Use Policies

The Vancouver City Council adopted an Industrial Lands Strategy that included a work program to ensure industrial zoning regulations meet the demands of modern industry and adjacent residents. Recently, Vancouver proposed four steps to guarantee the compatibility of zoning regulations. These steps include redefining industry to include more service industrial uses, such as expanding opportunities for some office uses in industrial districts, ensuring industrial development is compatible with adjoining residential districts, and facilitating change in inner city industrial areas by reducing parking requirements. Reduced parking requirements allow industries to increase the Floor Space Ratio (FSR); thereby, allowing a larger facility in a more compact location (City of Vancouver, 2009). To implement these recommendations, a new I-2 light industrial district schedule has been proposed. This schedule is similar to the existing M-1 industrial schedule.

Cities Analysis

Our research of these case study cities revealed several unique characteristics of the cities. Perhaps one of the most unique cities we researched is Vancouver, which does not offer financial incentives to businesses but believes companies should contribute monies to fund the growth of the city. Seattle and Portland, the other two northwest cities, have land use restrictions that determine the pattern of land use. For example, mountains and the ocean bound Seattle and Portland has developed an urban growth boundary that limits urban sprawl. In addition, Seattle is focused on promoting green industries and is a national leader in this field. Table 4 highlights examples of Seattle's policies and incentives used to attract green industries.

TABLE 4: Green Industrial/Manufacturing Incentives		
City	**Provider/Manager**	**Overview of Policy/Incentive**
Seattle, WA Biofuel Tax Credit	Washington State Department of Revenue	*Reduced B&O Tax Rate for Manufacturing E85 Motor Fuel and Wood Biomass Fuel:* This incentive is applicable for businesses who manufacture E85 or wood biomass fuel.
Seattle, WA Biofuel Tax Credit	Washington State Department of Revenue	*B&O Tax Deduction for Sales of Biofuels:* This program offers a tax deduction to retail sellers and distributers of biodiesel fuel and E85 motor fuel.
Seattle, WASolar Energy Equipment Manufacturing	Washington State Department of Revenue	*Solar Energy System and Components of Solar Energy Systems Manufacturers – Reduced B&O Tax Rate:* This incentive is offered to manufactures and businesses that sell their product at wholesale, as well as processors for hire of solar energy systems and specialized parts of solar energy systems using photovoltaic modules. Eligible businesses receive a reduced B&O tax rate of .275%.
Seattle, Energy Efficient Equipment	Washington State Department of Revenue	*Energy Efficient Commercial Equipment – B&O Tax Credit for Purchases:* This tax credit is available to businesses with a gross income of less than $750,000. Qualifying commercial equipment purchases must be made between July 1, 2008 and June 30, 2010.

Sources: Department of Revenue Washington State.
http://dor.wa.gov/content/FindTaxesAndRates/TaxIncentives/IncentivePrograms.aspx

Cities such as San Jose and Charlotte have a large amount of industrial land use vacancy and offer many financial incentives to entice industry. In addition, San Jose is unique due to Silicon Valley and the City's focus on technology and software industries. Los Angeles, long known for its film industry, has only recently begun to focus on attracting sustainable industry. Unlike San Jose and Charlotte, Los Angeles has a low vacancy rate that is particularly seen as an impediment to industrial development.

Chicago and New York have are historical industrial centers. Like other cities, they have experienced declines in the availability of industrial lands. Their solution to this problem is the creation of Planned Manufacturing Districts and Industrial Business Zones, which prohibit residential use in designated areas. Baltimore has an industrial history as well as a maritime history. Like other cities, Baltimore has fought to keep residential uses from encroaching upon industrial land. Finally, Minneapolis has a strong workforce and uses this strength to attract industry.

But do these tools work?

The diversity of tools to retain and attract industrial business speaks volumes about what does or does not work. Each city's political climate, planning ethos, and physical location influences the land use, financial and more innovative incentives detailed in this report. In order to uncover what has been the most beneficial policies for each city this policy team will conduct phone interviews and communicate directly with the people that have implemented the policies for each city. Through the analysis of these interviews we will then tailor a more comprehensive industrial plan for the city of Atlanta.

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The Industrial Sector in Atlanta

Manufacturing in Atlanta – An Overview

Atlanta is well known for its strong service economy, especially the Trade, Transportation and Utilities and increasingly Professional and Business Services industry sectors. These two sectors made up over 300,000 of total employment (740,000) in 2008.

Manufacturing, defined by the North American Industry Classification System (NAICS) code 31-33 for the sake of this paper, accounted for 31,129 jobs in the City of Atlanta in 2008, or 4.2% of all jobs, by place of business. This percentage is down from 5.2% of total employment in 2002. Food Manufacturing, Printing and Related Support Activities, Miscellaneous Manufacturing, and Nonmetallic Mineral Product Manufacturing are more than 50% of this total. Still, the benefits of manufacturing jobs should not be discounted. Average weekly wages for the existing jobs in the manufacturing sector in Atlanta were $1,397, almost 20% greater than the average for all industries in the City. As noted in Table 1-1 below, manufacturing subsectors also had significantly higher wages than that of the retail sector in Atlanta which had a $570 weekly wage for 2008.

Table 1-1: Atlanta Manufacturing Overview by SubSector

NAICS*	Industry Description – Subsector	Employment 2008	Percentage of Mfg.	Avg. Weekly Wage 2008
311	Food Manufacturing	9,475	30.4%	$2,012
323	Printing & Related Support Activities	3,202	10.3%	$952
339	Miscellaneous Manufacturing	2,418	7.8%	$1,222
327	Nonmetallic Mineral Product Mfg.	2,203	7.1%	$1,096
325	Chemical Manufacturing	2,025	6.5%	$1,242
326	Plastics & Rubber Products Mfg	1,790	5.8%	$812
332	Fabricated Metal Product Mfg.	1,775	5.7%	$909
334	Computer & Electronic Product Mfg.	1,454	4.7%	$1,491
337	Furniture & Related Product Mfg.	1,182	3.8%	$819
321	Wood Product Manufacturing	886	2.8%	$835
322	Paper Manufacturing	814	2.6%	$1,395
313	Textile Mills	685	2.2%	$1,595
312	Beverage & Tobacco Product Mfg.	653	2.1%	$928
336	Transportation Equipment Mfg.	511	1.6%	$1,110

Source: Georgia Department of Labor, LaborMarket Explorer

*NAICS – North American Industrial Classification System

Manufacturing in the City of Atlanta has declined by approximately 17.7%, from 37,840 since 2002. This decline can be partially attributed to deep drops in Transportation Equipment Manufacturing and Printing & Related Support Activities, which lost over 2,000 and 1,000 jobs, respectively. Computer & Electronic Product Manufacturing and Paper Manufacturing also experienced significant job loss, with nearly 1,500 jobs lost in the two subsectors. Despite the continued effects of economic restructuring on the manufacturing base in Atlanta, some subsectors were performed well, including: Miscellaneous Manufacturing, Food Manufacturing, and Fabricated Metal Product Manufacturing. These three industries gained over 1,800 of the manufacturing jobs created during this period. The following Table 1-2 lists the subsectors with over 500 jobs in 2002 or 2008, where data was available for both years.

Table 1-2: Local Change in Manufacturing – Jobs and Rate Change by SubSector

NAICS Code	Industry	Number of Jobs Gained/Lost	Percent Growth/Decline (2002-2008)
311	Food Manufacturing	588	6.6%
312	Beverage & Tobacco Product Mfg	(215)	(24.8%)
314	Textile Product Mills	(304)	(45.9%)
315	Apparel Manufacturing	(263)	(41.2%)
321	Wood Product Manufacturing	43	5.1%
322	Paper Manufacturing	(805)	(49.7%)
323	Printing & Related Support	(1,196)	(27.2%)
325	Chemical Manufacturing	(225)	(13.8%)
326	Plastics & Rubber Product Mfg	(105)	(5.5%)
327	Nonmetallic Mineral Mfg	112	5.4%
332	Fabricated Metal Mfg	252	24.7%
334	Computer & Electronic Products	(907)	(38.4%)
336	Transportation Equipment Mfg	(3,339)	(86.7%)
337	Furniture & Related Product Mfg	(295)	(20.0%)
339	Miscellaneous Manufacturing	1,083	81.1%

Source: Georgia Department of Labor, LaborMarket Explorer

To understand how this compares with the rest of the country, a deeper investigation of the larger job gains and losses in these sectors is needed. As the largest driver of employment gain within the entire

manufacturing sector, miscellaneous manufacturing deserves a closer look. Medical equipment and supplies was by far the largest component of growth in this sector, with the industry providing over 1,200 jobs during the period, greater than the entire change in the subsector. Food manufacturing had the second largest change, by number of jobs, and this may be partially explained by an increase in retail and commercial bakeries, where over 200 jobs were created over the six year period. Unfortunately, the severe drop in employment in the transportation equipment manufacturing subsector has little data identifying losses that span from 2002 to 2008, but available data on declines in motor vehicle part manufacturing in 2003 and 2004 indicate this was at least partially responsible. Similar difficulties exist in narrowing down the industries where the computer and electronic product lost employment, although available data on declines in the earlier part of the period point to Navigational & Measuring equipment and Computer and Peripheral equipment trending downwards. Finally, employment in printing services was plagued by losses in prepress services, commercial lithographic printing, and quick printing, with over 900 jobs lost between the three industries.

In relation to the rest of the United States, manufacturing in Atlanta represents both a smaller portion of total employment, and has decreased at a faster rate over the past six years. Still, there have been, and continue to exist, industries that have higher employment concentration than the rest of the country. Using location quotients (LQs) - a comparative percentage of industry to a reference economy - as a guide for employment concentration, a few manufacturing industries stand out as areas of strength. It is not surprising that many of these same industries have had growth that has outpaced the national growth (or decline). LQs greater than 1.0 indicate that the local labor market has a greater proportion of its workers in a given sector than the national average, whereas an LQ less than one would indicate the reverse. Table 1-3 shows industries with LQs greater than 1.0 and increases in these numbers of greater than 0.5.

Table 1-3: Atlanta Labor Force Strengths: Location Quotients and Jobs in 2008 and Change in LQ by percentage from 2002 to 2008

NAICS	Industry Description	Location Quotient	LQ Change (2002-2008)	# of Jobs – 2008
311	Food Manufacturing	1.17	16.3%	9,475
3133	Textile & Fabric Finishing	1.88	851.4%	501
32192	Wood Container & Pallet Mfg	1.21	152.7%	379
32311	Commercial Lithographic	1.01	5.9%	1,270
3256	Soap, Clean. Compound and Toilet Prep Mfg	1.65	7.2%	978
325910	Printing Ink Manufacturing	3.58	54.7%	219
323115	Digital Printing	1.40	107.8%	186
32616	Plastics Bottle Mfg	4.31	4.2%	813
3279	Other Nonmetallic Mineral Mfg	1.87	37.4%	794
336212	Truck Trailer Mfg.	1.74	N/A	297
3391	Medical Equipment & Supplies Mfg	0.90	317.9%	1523

Source: Georgia Department of Labor, LaborMarket Explorer

Taking the analysis of the local economy one step further, shift share analyses have been associated with understanding which of three factors have been involved in the growth local economies: growth or decline due to changes in the national economy, a proportional shift, which is growth or decline due to overall changes in the industry, and a differential shift, which helps to explain the competitive advantage a certain location may have. Higher differential shifts show strengths in the local economy (Blakely & Bradshaw, 2002).

Table 1-4: Atlanta's Competitive Advantage vs. the Nation

NAICS Code	Industry Definition	Differential Shift (DS)	Jobs Attributable to DS
311	Food Manufacturing	10.44%	927.37
3133	Textile & Fabric Finishing	474.21%	445.76
3141	Textile Furnishing Mills	12.98%	20.12
321	Wood Product Manufacturing	23.05%	194.31
323115	Digital Printing	127.90%	92.09
324	Petroleum & Coal Products	5.42%	9.9
325510	Paint & Coating Manufacturing	52.95%	80.49
325910	Printing Ink Manufacturing	40.50%	70.46
327	Nonmetallic Mineral Product Mfg.	15.68%	327.84
3273	Cement & Concrete Product Mfg	11.10%	76.18
3279	Other Nonmetallic Mineral Prod	33.34%	187.72
332	Fabricated Metal Product Mfg	25.21%	358.69
3323	Architectural & Structural Metals	21.06%	116.26
333	Machinery Manufacturing	21.46%	69.09
3335	Metalworking Machinery	49.96%	34.47
335	Electrical Eq., Appliance Mfg	3.00%	23.15
3371	Household & Inst. Furniture	14.61%	50.56
337910	Mattress Manufacturing	24.75%	26.73
3391	Medical Eq. & Supplies Mfg	299.41%	1140.75

Source: Georgia Department of Labor, LaborMarket Explorer

* Table 1-4 does not include industries where declines in national trends have manipulated local data to show positive differential shifts, although there has been job loss here as well. These industries were excluded because they are seen as having negative growth trends both nationally and locally.

Based on industry targeting decision tree analyses - where local specialization, local growth, and industry growth are assessed - this paper will break down the industries of interest into four groups: Current Strengths, High Priority Retention Targets, Local Strengths with Limited Prospects, and Emerging Strengths. Current strengths will be defined as those industries where the local economy has current specialization, is experiencing local growth, and the industry is gaining competitive share. High Priority Retention targets are industries where specialization and local growth exist, but the industry's competitive share may be slipping. Strength with limited prospects represents industries that are either

growing or stable, but may have local constraints or declining external trends. Finally Emerging Strengths are industries that are growing nationally and locally, but current specialization locally does not exist. (McLean & Voytek, 1992)

Current Strengths: Digital Printing, Other Nonmetallic Mineral Product Mfg., Truck Trailer Manufacturing*

High Priority Retention Targets: Food Manufacturing, Bakeries and Tortilla Manufacturing, Textile & Fabric Finishing, Wood Container & Pallet Mfg., Printing Ink Mfg.

Local Strengths with limited prospects: Medical Equipment & Supplies Mfg., Paint & Coating Manufacturing, Rubber Product Manufacturing, Nonmetallic Mineral Product Mfg., Fabricated Metal Manufacturing, Architectural and Structural Metals, Machinery Manufacturing

Emerging Strengths: Sheet Metal Work Manufacturing, Metal, Coating & Engraving

*Truck Trailer Manufacturing Employment Data was unavailable for 2002. Increases in employment are assumed based on an increase in employment since 2005 and the assumption that increased establishments in this industry allowed for the release of previously private data.

Although recommendations should not be made on these assessments alone – workforce indicators, employment trends in non-categorized industries, and local resources and assets are just some of the factors that must be taken into account – the information provided here may help to guide deeper analysis into these industries to understand their needs and constraints. Additionally, although some of these industries have not gained competitive share over the past six years and are labeled as having limited prospects due to declining industry competitiveness, anticipated future growth would push these into the emerging strengths categories. Industries that may have shown little growth over the past few years and may be unfairly categorized as strengths with limited prospects are Medical Equipment and Supplies Manufacturing, Paint and Coating Manufacturing, and Nonmetallic Mineral Product Manufacturing, due to changes in the healthcare industry and green building construction.

Atlanta in Comparison

This report also aimed to understand how Atlanta compares to cities that have enacted plans to retain industrial uses. Los Angeles, Chicago, and Brooklyn were used for this comparison, based on the change in manufacturing from 2002-2008. All subsectors of manufacturing were chosen in comparing Atlanta to these "benchmark" cities. As with the country and Atlanta, manufacturing decreased in all three comparison cities, despite attempts to shore up industry.

Manufacturing job losses in the comparison cities is more pronounced because they have larger manufacturing bases. Manufacturing employment in Chicago dropped from 108,859 or 9.9% of total employment, in 2002 to 78,670, or 7.2% of total employment in 2008, according to the Illinois Department of Labor. Similarly, Brooklyn had approximately 8.8% of its 406,918 total employees in 2002 working in the manufacturing sector. Out of the 443,922 employee population in Brooklyn in 2008, only 23,350 remained in the manufacturing sector, a precipitous drop of 3.5% of the total employment in the county. The comparison economy most heavily dependent on manufacturing based on total employment is the City of Los Angeles. Despite a smaller percentage decrease than the other municipalities in manufacturing employment, the manufacturing sector representation amongst the total economy of Los Angeles has also decreased dramatically. In 2002, over 180,000 jobs were in the manufacturing sector in Los Angeles, amounting to 11.3% of the total employment in the city. As of 2008, the increase in total employment and decrease in manufacturing has reduced the manufacturing sector's representation to about 8.8% of total employment.

In comparison, though Atlanta has historically had a smaller manufacturing sector than the benchmark cities, the decrease in employment has been less drastic within the sector over the past six years. Now that a macro view has been established of manufacturing's diminishing place in total employment, we should investigate the 2008 composition of three benchmark cities while keeping mind Atlanta's manufacturing makeup with strengths in Food, Printing, Miscellaneous, Nonmetallic Mineral Products, Chemicals, Plastics & Rubber, and Fabricated Metals Manufacturing, all of which contribute to over five percent of total manufacturing employment in Atlanta. Table 1-5 illustrates this:

Table 1-5: Benchmark City Manufacturing Data (2008)

NAICS Code	Industry Definition	Chicago – % of Mfg	Brooklyn – % of Mfg	Los Angeles – % of Mfg
31-33	Manufacturing	78,670	23,350	153,993
311	Food Manufacturing	19,047 (24.2%)	5,407 (23.2%)	18,141 (11.8%)
312	Beverage & Tob Prod. Mfg.	1,041 (1.3%)	372 (1.6%)	2,598 (1.7%)
313	Textile Mills	458 (0.6%)	218 (0.9%)	5,224 (3.4%)
314	Textile Product Mills	1,360 (1.7%)	320 (1.4%)	2,850 (1.9%)
315	Apparel Manufacturing	2,195 (2.8%)	3,605 (15.4%)	39,783 (25.8%)
321	Wood Product Mfg.	585 (0.7%)	490 (2.1%)	1,508 (1.0%)
322	Paper Manufacturing	4,474 (5.7%)	682 (2.9%)	1,890 (1.2%)
323	Printing & Related Activs.	5,408 (6.9%)	1,497 (6.4%)	10,769 (7.0%)
324	Petroleum & Coal Prod.	468 (0.6%)	N/A	1,420 (0.9%)
325	Chemical Manufacturing	3,535 (4.5%)	1,156 (5.0%)	9,060 (5.9%)
326	Plastic & Rubber Prod.	2,084 (2.6%)	771 (3.3%)	5,086 (3.3%)
327	Nonmetallic Mineral Prod	1,465 (1.9%)	604 (2.9%)	3,623 (2.4%)
331	Primary Metal Mfg	2,194 (2.8%)	138 (0.6%)	1,416 (0.9%)
332	Fabricated Metal Mfg	12,396 (15.8%)	2,990 (12.8%)	15,154 (9.8%)
333	Machinery Mfg.	2,541 (3.2%)	312 (1.3%)	4,778 (3.1%)
334	Computer & Elec. Prod.	1,915 (2.4%)	1,004 (4.3%)	16,052 (10.4%)
336	Transportation Eq. Mfg	4,621 (5.9%)	164 (0.7%)	9,669 (6.3%)
337	Furniture & Related Mfg	3,933 (5.0%)	1,477 (6.3%)	9,278 (6.0%)
339	Misc. Manufacturing	4,449 (5.7%)	1,626 (7.0%)	10,683 (6.9%)

Source: Illinois Department of Labor, California Economic Development Department, United States Bureau of Labor Statistics

Industry retention is a critical element for maintaining the cities industrial land. It is important to represent the components of manufacturing so that we may show which subsectors these cities felt were most important to protect from outside recruitment, encroachment, and land use changes, in order to sustain their industrial base. Chicago is similar to Atlanta in that two industries each make up over 10% of the total manufacturing base. Los Angeles and Brooklyn each had three industries with over ten percent of their total manufacturing employment. Expanding these larger portions of the

manufacturing industry to those with over five percent of employment, Chicago, Atlanta, and Brooklyn all have seven subsectors of manufacturing that fit into this profile. Los Angeles leads the group with nine subsectors that comprise over five percent of their manufacturing base. In all of the benchmark cities, Food Manufacturing makes up over ten percent of manufacturing employment. Atlanta was the only city that had a net positive gain in employment for this subsector. Food was also the largest subsector for all cities excluding L.A, where Apparel manufacturing made up over 25% of manufacturing employment. Apparel Manufacturing was also the second largest employment component in Brooklyn, but both cities suffered a decline in this subsector of employment over the 2002-2008 period. Chicago and Atlanta's second largest manufacturing components also saw declines, being Fabricated Metals and Printing & Support Activities, respectively. Table 1-6 shows the change in employment for all manufacturing subsectors from 2002-2008.

Table 1-6 reveals that although other cities have lost employment in almost all industries, Atlanta had had a more mixed response to the nations continued economic restructuring in its central cities. Amongst the five subsectors that make up between five and ten percent of Atlanta's entire manufacturing base, three experienced increases in employment, while one subsector, Chemical Manufacturing, was relatively stable with a 1.4% decrease in employment. Only Plastics & Rubber Manufacturing saw a significant decrease in employment during the period. In comparison, Chicago and Brooklyn saw employment losses of nine percent or more in all industry subsectors which had between five to ten percent of manufacturing employment. Finally, in Los Angeles, where manufacturing is arguably the most important amongst the comparison cities because of its larger share of total employment, only Chemical manufacturing has been stable among the largest manufacturing subsectors (declined less than one percent).

Table 1-6: Atlanta vs. Benchmark Cities – Changes in Employment from 2002 to 2008

Industry	Atlanta – Percent Change in Employment	Chicago – Percent Change in Employment	Brooklyn – Percent Change in Employment	Los Angeles – Percent Change in Employment
Manufacturing	(17.7%)	(27.7%)	(34.5%)	(17.0%)
Food Manufacturing	6.6%	(16.7%)	(7.8%)	(9.0%)
Bvrg & Tob Prod Mfg.	(24.8%)	(39.4%)	7.8%	37.6%
Textile Mills	N/A	(29.9%)	(70.3%)	(28.3%)
Textile Product Mills	(45.9%)	(5.6%)	(61.1%)	(39.2%)
Apparel Manufacturing	(41.2%)	(50.4%)	(58.5%)	(14.2%)
Wood Product Mfg.	5.1%	(27.9%)	1.9%	(6.3%)
Paper Manufacturing	(49.7%)	(26.4%)	(44.3%)	(26.6%)
Printing & Rel Act.	(27.2%)	(25.7%)	(26.7%)	(37.1%)
Petroleum & Coal Prod.	3.3%	(20.3%)	N/A	16.1%
Chemical Mfg	(13.8%)	(40.9%)	(58.6%)	(0.8%)
Plastic & Rubber Prod.	(5.5%)	(39.5%)	(29.0%)	(23.6%)
Nonmetl Min Prod Mfg	5.4%	(17.4%)	(15.8%)	(18.2%)
Primary Metal Mfg	(18.9%)	(26.9%)	(18.8%)	(12.1%)
Fabricated Metal Mfg	24.7%	(33.5%)	(18.8%)	(10.1%)
Machinery Mfg.	18.0%	(33.2%)	(52.1%)	(17.4%)
Computer & Elec. Prod.	(38.4%)	(37.7%)	18.0%	(10.7%)
Transportation Eq. Mfg	(86.7%)	(23.0%)	(30.8%)	(20.2%)
Furniture & Rel. Mfg	(20.0%)	(21.9%)	(24.7%)	(43.3%)
Misc. Manufacturing	81.1%	(9.0%)	(30.3%)	(18.2%)

Source: Georgia Department of Labor, Illinois Department of Labor, California Economic Development Department, United States Bureau of Labor Statistics

Strategy for the Future

Retaining and expanding the existing manufacturing base is a goal of all three comparative cities. New York's Industrial Retention Network conducts research, business services, and advocacy for and on behalf of local manufacturers (NYIRN.org, 2009). Los Angeles's city plan for development of industrial land specifically notes the retention of existing industries as a key to both providing job opportunities to residents and protecting encroachment on properly zoned industrial parcels (L.A. Dept. of Planning, 2007). Chicago has the Local Industrial Retention Initiative, where groups represent manufacturers from

geographic areas around the city (CDWebsites.net, 2009). All of these responses are attempts to strengthen need for industrial jobs in the city.

In addition to retention of existing manufacturing businesses, these cities share another common goal: targeting emerging industries. For industry today, this often means becoming more environmentally friendly. Los Angeles specifically calls for increased recruitment and development within city limits of clean tech companies (L.A. Dept. of City Planning, 2007). The Chicago Industrial Rebuild Program, a project of the Chicago Department of environment targets waste and energy intensive industries. The goal of this program is to increase these industries' bottom line by decreasing their resource costs, while positioning them to take advantage of emerging benefits of consumer environmental awareness. The city continues to add industries into the program and has already worked with Chemical, Metal Casting, and Food Manufacturers. (Chicago Dept of Environment, n.d) Chicago's Manufacturing Renaissance Council and the Chicago Manufacturing Center have also put together a Green Manufacturing Network and a Waste to Profit Network, respectively. These networks are an attempt to link local manufacturers, waste companies, and other facilitating parties in emerging green markets, which will lead to sustainable employment in manufacturing for the city in the future.

To properly assess these industries where growth or nascent technologies are leading the way in creating entirely new products, the third section of this report identifies important emerging trends, including green technologies, which may aid in creating a strategic sustainable industry plan.

National Industrial Trends

The Bureau of Labor Statistics (BLS) regularly publishes a career guide to industries that describes industry sectors in detail and provides employment projections for a 10-year period. The most recent guide was published in 2006; therefore, the employment projections and industrial growth projections cited below are based on the period from 2006-2016. An obvious point worth highlighting is that these projections were made before the current financial crisis and recession took effect. However, it can be argued that, because the crisis is national, all firms and industry sectors face reasonably similar challenges. Thus, those industries projected to grow should still grow relative to other industries and the rest of the economy.

BLS divides the manufacturing sector into ten industry segments:

- aerospace products and parts manufacturing
- chemical manufacturing (except pharmaceutical and medicine manufacturing)
- computer and electronic product manufacturing
- food manufacturing
- machinery manufacturing
- motor vehicle and parts manufacturing
- pharmaceutical and medicine manufacturing
- printing
- steel manufacturing
- textile, textile product, and apparel manufacturing

Of these sectors, only two show growth over the projected period: aerospace products and parts manufacturing and pharmaceutical and medicine manufacturing. Food manufacturing is stable, and we have a strong local industry in Atlanta as noted in the section on Atlanta trends. Two sectors are declining but, nevertheless, have some growth potential in Atlanta because of local conditions. Computers and electronic product manufacturing relies heavily on research and design (R&D), and Atlanta has a good knowledge base to perhaps capture future growth that might occur regionally. Motor vehicle and parts manufacturing, though declining nationally, is actually growing in the Southeast as the jobs are shifting to this region from their traditional base in the Midwest. This section will analyze the three industry sectors that are growing or stable, as well as the two sectors that are declining nationally but which have local growth potential.

(Note: For most of the industries discussed below, the R&D occupations are not counted. Though usually associated with technological advancements in manufacturing processes, R&D jobs are not part of the overall employment picture because the jobs are usually housed in separate facilities and, thus, are classified under a different NAICS code).

Aerospace Products and Parts Manufacturing

BLS makes the following points about aerospace industry:

- Production and professional jobs account for the largest share of employment.
- Earnings are higher, on average, than in most other industries.
- Employment is projected to grow more slowly than in other industries.
- During slowdowns in aerospace manufacturing, production workers are vulnerable to layoffs, while professional workers enjoy more job stability. (Aerospace Products and Parts Manufacturing)

The aerospace industry, along with medicine and pharmaceuticals, is one of only two sectors of manufacturing projected to grow over the next several years. The aerospace industry is characterized by firms that manufacture commercial aircraft, aircraft engines, military aircraft, and missiles. The Department of Defense is one of the largest consumers of aerospace products. Likewise, government contracting accounts for a significant portion of business in this industry (Aerospace Products and Parts Manufacturing). Rather than several small firms, "the aerospace industry is dominated by a few large firms that contract to produce aircraft with Government and private businesses, usually airline and cargo transportation companies. These large firms, in turn, subcontract with smaller firms to produce specific systems and parts for their vehicles," (BLS, 2007a)

According to the BLS, "the average production employee in aerospace products and parts production worked 43.8 hours a week in 2006, compared with 41.1 hours a week for all manufacturing workers and 33.9 hours a week for workers in all industries. About half of all workers in this industry worked a standard 40 hour week" (BLS 2007a). In 2006, about 2,900 establishments made up the aerospace industry. In the aerospace parts industry, specifically, most establishments were subcontractors manufacturing parts and employing fewer than 100 workers. However, in 2006, over 60 percent of jobs in the aerospace industry were with firms employing 1,000 workers or more (BLS, 2007a).

In the aerospace industry (and in most manufacturing sectors), "production, professional and related, administrative support, and managerial occupations make up the bulk of employment," with sales often completing the picture (BLS, 2007a). The professional and related occupations consist primarily of various types of engineers. Production workers include those who work in installation, maintenance,

and repair as well as transportation and material-moving. Forty percent of all aerospace workers are employed in this production category (BLS, 2007a). Of all the occupations related to the aerospace industry, only a handful are projected to decline (see Table 2-1, Appendix A). In fact, even among production jobs (which are declining in most manufacturing sectors), growth is expected for a large percentage (8 out of 11). No research and design (R&D) jobs are counted in the employment data because they are considered part of research and development in the physical, engineering, and life sciences, which falls under a different NAICS code.

Regarding training and advancement, "The proportion of workers with education beyond high school is larger in the aerospace industry than the average for all industries. Because employers need well-informed, knowledgeable employees who can keep up with the rapid technological advancements in aerospace manufacturing, the industry provides substantial support for the education and training of its workers," (BLS, 2007a).

Between 2006-2016, wage and salary employment in the aerospace product and parts manufacturing industry is expected to grow by five percent. This is slower than the 11-percent growth projected for all industries combined. As it relates to wages, "Production workers in the aerospace industry earn higher pay than the average for all industries," (BLS, 2007a). Weekly earnings for production workers averaged $1,153 in aerospace product parts manufacturing for 2006, compared with $691 in all manufacturing and $568 in all private industry (BLS, 2007a). Table 2-2 below shows the median hourly earnings for the largest occupations in the aerospace manufacturing industry.

Table 2-2. Median hourly earnings of the largest occupations in aerospace products and parts manufacturing, May 2006

	Aerospace product and parts manufacturing	All industries
Engineering managers	$53.38	$50.69
Computer software engineers, applications	40.71	38.36
Aerospace engineers	39.91	42.12
Mechanical engineers	36.58	33.58
Industrial engineers	33.75	32.99
Purchasing agents, except wholesale, retail, and farm products	28.55	24.39
Aircraft structure, surfaces, rigging, and systems assemblers	22.18	21.83
Aircraft mechanics and service technicians	21.58	22.95
Inspectors, testers, sorters, samplers, and weighers	20.62	14.14
Machinists	18.46	16.71

Source: Bureau of Labor Statistics: Aerospace Products and Parts Manufacturing http://www.bls.gov/oco/cg/cgs006.htm

Pharmaceutical and Medicine Manufacturing

The following points are significant for the pharmaceutical and medicine manufacturing industry according to the BLS's Career Guide to Industries:

- Ranks among the fastest growing manufacturing industries.
- Six out of ten workers with a bachelor's, master's, professional, or Ph.D. degree—twice the proportion for all industries combined.
- 43.3 percent of all jobs are in large establishments employing more than 1,000 workers.
- Earnings are much higher than in other manufacturing industries. (BLS, 2007b)

The drugs and technology produced by this manufacturing sector are used for "diagnostic, preventive, and therapeutic uses" and "save the lives of millions of people from various diseases and permit many ill people to recover to lead normal lives," (Pharmaceutical and Medicine Manufacturing). R&D is arguably more integral to the pharmaceutical industry than any other manufacturing sector in the nation. The industry's products are heavily regulated and tested by agencies like the Food and Drug Administration. This rigorous testing process drives up costs and lengthens the time span to get from an idea to an actual product on the market.

This industry is made up of over 2,500 places of employment, including "establishments that make pharmaceutical preparations or finished drugs; biological products, such as serums and vaccines; bulk chemicals and botanicals used in making finished drugs; and diagnostic substances such as pregnancy and blood glucose kits," (BLS, 2007b). One of the reasons for such high growth in this area of manufacturing is the rapid advancement in technology associated with new types of medicines and medical equipment. The industry also stands to capitalize on gains being made in areas like biotechnology and nanotechnology, which have the potential to stimulate leaps in information and processes. According to the BLS, "Advances in biotechnology are transforming drug discovery and development. Bioinformatics, a branch of biotechnology using information technologies to work with biological data like DNA, is a particularly dynamic new area of work," (BLS, 2007b).

In 2006, workers in the pharmaceutical and medicine sector worked an average of "41.8 hours per week, compared with 33.9 for workers in all industries," (BLS, 2007b). (Again a similar note appears in the BLS data as with most other manufacturing sectors: "Under the North American Industry Classification System (NAICS), workers in research and development (R&D) establishments that are not part of a manufacturing facility are included in a separate industry—research and development in the physical, engineering, and life sciences. However, due to the importance of R&D work to the pharmaceutical and medicine manufacturing industry, drug-related R&D is discussed in this statement even though a large proportion of pharmaceutical industry-related R&D workers are not included in the employment data." (BLS, 2007b)).

Table 2-3 in Appendix B shows that the pharmaceutical industry is projected to grow by almost 24 percent through 2016, by far the highest rate of growth for all manufacturing sectors. In fact, it is projected to grow at over four times the pace of aerospace, the next fastest growing industry. The rate

of growth for all industries (not just manufacturing) is projected at 11 percent. Production and professional occupations make up around 54 percent of jobs in the industry. While both types of occupations are projected to make substantial gains, professional occupations have the edge at 26.4 percent growth versus 21.9 percent for production occupations. Transportation-related jobs are poised to make the smallest gain, which is still a substantial 11.5 percent.

While training for occupations in the pharmaceutical sector vary significantly, "more than 6 out of 10 of all workers have a bachelor's, master's, professional, or Ph.D. degree—more than twice the proportion for all industries combined," (BLS, 2007b) For production workers, companies usually hire untrained workers and train them on the job. A high school diploma is usually required. The average weekly wage for a worker in the pharmaceutical industry in 2006 was $891 a week, almost $200 higher than those in all manufacturing industries and over $300 more a week than all private industry. Table 2-4 below provides a full overview.

Table 2-4. Median hourly earnings of the largest occupations in pharmaceutical and medicine manufacturing, May 2006

	Pharmaceutical and medicine manufacturing	All industries
Medical scientists, except epidemiologists	$39.73	$29.66
Chemists	27.51	28.78
First-line super. of production/operating workers	27	22.74
Maintenance and repair workers, general	20.51	15.34
Chemical technicians	19.38	18.87
Biological technicians	18.93	17.17
Chemical equipment operators and tenders	17.1	19.37
Inspectors, testers, sorters, samplers, and wghrs	15.69	14.14
Mix. and blend. machine setters, opertrs./tenders	14.22	14.1
Packaging and filling machine operators/tenders	11.81	11.06

Source: Bureau of Labor Statistics: Pharmaceutical and Medicine Manufacturing http://www.bls.gov/oco/cg/cgs009.htm

Food Manufacturing

According to the BLS, significant points related to the food manufacturing sector include:

- One of the highest incidences of injury and illness among all industries; animal slaughtering plants have the highest incidence among all food manufacturing industries.
- Production workers account for 54 percent of all jobs.
- Production jobs require little formal education or training; many can be learned in a few days.
- Unlike many other industries, food manufacturing is not highly sensitive to economic conditions. (BLS, 2007c)

Workers in the food manufacturing industry perform a wide range of tasks, all of which contribute to "processing raw fruits, vegetables, grains, meats, and dairy products into finished goods ready for the grocer or wholesaler to sell to households, restaurants, or institutional food services," (BLS, 2007c). According to Table 2-5, the food manufacturing sector is projected to grow by 0.3 percent through 2016, making it a stable industry going forward. However, only animal slaughtering and processing, bakeries, and other food manufacturing are projected to increase. That is only representative of three industry segments out of nine. However, because animal slaughtering and processing employs over one-third of the workforce, the 11.8 percent projected growth in that industry segment appears to be the stabilizing force for the full industry over the next several years. According to the BLS, "The average production employee in food manufacturing worked 40.1 hours a week in 2006, compared with 41.1 hours a week for all manufacturing workers and 33.9 hours a week for workers in all industries," (BLS, 2007c).

Table 2-5. Distribution of wage and salary employment in food manufacturing by industry segment, 2006

	2006 Employment (thousands)	2006-16 Percent Change
Food manufacturing, total	**1,484**	**0.3**
Animal slaughtering and processing	509	11.8
Bakeries and tortilla manufacturing	280	1.5
Fruit and vegetable preserving and specialty food manufacturing	177	-12.3
Dairy product manufacturing	132	-3.9
Sugar and confectionery product manufacturing	75	-18
Grain and oilseed milling	60	-15
Animal food manufacturing	50	-15.5
Seafood product preparation and packaging	40	-11
Other food manufacturing	160	1.6

Source: Bureau of Labor Statistics: Food Manufacturing http://www.bls.gov/oco/cg/cgs011.htm

The work environment in the food manufacturing industry is notoriously dangerous. As mentioned in the points of significance from the BLS, it has "one of the highest incidences of injury and illness among all industries; animal slaughtering plants have the highest incidence among all food manufacturing industries." While many improvements have been made in the industry over the years including automating some of the more dangerous processes, most of the work remains at least somewhat uncomfortable, noisy, smelly, and generally hazardous to worker health. In addition, most of the work done in slaughtering and processing animals (some of the most dangerous work) is incapable of being automated.

The industry provided over 1.5 million jobs in 2006, making it one of the largest employers among manufacturing industries. As evidenced by Table 2-6 in Appendix C, almost 54 percent of workers in the food manufacturing industry are production employees. This occupational category is projected to grow

by 3.7 percent through 2016. Eighteen percent of workers in this industry are employed in transportation and material moving occupations, though this category is projected to decrease by about nine percent in the coming years. Professional and service occupations as well as installation, repair, and maintenance occupations are all poised to see employment gains.

According to the BLS, "Most production jobs in food manufacturing require little formal education. Graduation from high school is preferred, but not always required. In general, inexperienced workers start as helpers to experienced workers and learn skills on the job. Many of these entry-level jobs can be learned in a few days," (BLS, 2007c). Regarding employment change and job prospects, production workers will experience the highest job growth in food manufacturing. These workers already account for nearly 54 percent of employment. The BLS explains, "Because many of the cutting, chopping, and eviscerating tasks performed by these workers have proven difficult to automate, employment among handworkers will rise along with the growing demand for food products, especially beef," (BLS, 2007c). It is also worth noting that food manufacturing is relatively unaffected by the state of the economy. Food demand is likely to remain stable even during downturns like the one the United States is currently experiencing. This is good news for Atlanta because food manufacturing is a big part of existing industry in the city.

Table 2-7 shows average weekly and hourly earnings for workers in the food manufacturing industry segment. The average weekly wage in 2006 was $526, slightly less than the $568 weekly average for all of private industry. However, the weekly wage for food manufacturing workers is almost $170 less than for other manufacturing industries. Furthermore, those who work in animal slaughtering and processing make even less, which is significant because those jobs make up a considerable portion of the overall jobs for the industry segment.

Table 2-7. Average earnings of production or nonsupervisory workers in food manufacturing by industry segment, 2006

	Weekly	Hourly
Total, private industry	**$568**	**$16.76**
Food manufacturing	526	13.13
Grain and oilseed milling	785	18.88
Dairy products	726	16.80
Animal food	620	14.25
Other food products	561	13.88
Fruit and vegetable preserving and specialty	541	13.30
Sugar and confectionery products	539	15.19
Bakeries and tortilla manufacturing	488	12.63
Animal slaughtering and processing	463	11.49
Seafood product preparation and packaging	408	11.74

Source: Bureau of Labor Statistics: Food Manufacturing http://www.bls.gov/oco/cg/cgs011.htm

Table 2-8 provides a more in-depth look at hourly earnings for the largest occupations within the food manufacturing sector. Not surprisingly, supervisors and managers are the highest paid, while hand packers and packagers are the lowest paid. Again, this is significant because this type of occupation is projected to be one of the fastest growing over the next several years.

Table 2-8. Median hourly earnings of the largest occupations in food manufacturing, May 2006

	Food manufacturing	All industries
First-line supervisors/managers of production and operating workers	$21.06	$22.74
Maintenance and repair workers, general	16.9	15.34
Packaging and filling machine operators and tenders	11.75	11.06
Food batchmakers	11.55	11.11
Bakers	10.84	10.59
Laborers and freight, stock, and material movers, hand	10.56	10.2
Slaughterers and meat packers	10.43	10.43
Helpers—production workers	10.1	9.97
Meat, poultry, and fish cutters and trimmers	9.79	9.79
Packers and packagers, hand	9.35	8.48

Source: Bureau of Labor Statistics: Food Manufacturing http://www.bls.gov/oco/cg/cgs011.htm

Computer and Electronic Product Manufacturing

The following points are significant regarding the computer and electronic product manufacturing industry according to the BLS:

- Employment is projected to decline 12 percent over the 2006-16 period due to productivity improvements, imports, and the movement of some jobs to lower wage countries.
- Characterized by significant research and development activity and rapid technological change.
- Professional and related personnel account for 1 out of 3 workers. (BLS, 2007d)

Though this is a sector that is declining overall, it has some potential for growth in Atlanta. This is primarily due to the R&D-heavy nature of the industry. According to the BLS, "The rapid pace of innovation in electronics technology makes for a constant demand for newer and faster products and applications. This demand puts a greater emphasis on R&D than is typical in most manufacturing

operations" (BLS, 2007d). Because of the knowledge base here in Atlanta and, particularly, at Georgia Tech, the city has an advantage for capturing any regional growth that might occur within the industry. Though, as noted in the introduction, R&D jobs are not counted in the overall employment picture, those types of jobs are significant in this industry. Furthermore, heavy R&D activities may also spawn new physical manufacturing processes locally.

Regarding working conditions, "About half of all employees work regular 40-hour weeks, but pressure to develop new products ahead of competitors may result in some R&D personnel working extensive overtime to meet deadlines," (BLS, 2007d). The industry provided over 1.3 million jobs in 2006, making it one of the largest employers among manufacturing industries. The computer and electronic industry is comprised of the same occupational categories as most other manufacturing sectors: professional, production, management, administrative, and sales. The production and professional jobs account for almost 65 percent of the workforce (see Table 2-9, Appendix D).

Overall employment is projected to decline by 12 percent through 2016. Aerospace engineers and industrial engineers are the only two occupation categories projected to grow over that same period. Regarding potential for advancement for production-level workers the BLS notes: "Although assembly workers generally need only a high school diploma, assemblers in the computer and electronic product manufacturing industry may need more specialized training or experience than do workers in other manufacturing industries," (BLS, 2007d). The implication here is that the computer and electronic manufacturing sector requires a more educated and/or skilled workforce than other sectors. This may be a prohibitive factor in Atlanta securing manufacturing jobs that might result from the R&D conducted here.

As evidenced in Table 2-10, the two industry segments with the slowest projected decline over the next several years in communications equipment and manufacturing and reproducing magnetic and optical media. These are two areas, especially communications equipment, where Atlanta might be able to capitalize on our knowledge base and existing industry partners.

	Percent change
Computer and electronic product manufacturing, total	-12.00
Communications equipment	0.40
Manufacturing and reproducing magnetic and optical media	-3.70
Navigational, measuring, electromedical, and control instruments	-4.50
Semiconductor and other electronic components	-13.70
Audio and video equipment	-21.10
Computer and peripheral equipment	-33.50

Table 2-10. Projected employment change in computer and electronic product manufacturing by

Source: Bureau of Labor Statistics: Computer and Electronic Product Manufacturing http://www.bls.gov/oco/cg/cgs010.htm

According to the BLS, "many employment opportunities should continue to arise in the industry due to the technological revolutions taking place in computers, semiconductors, and telecommunications, as well as the need to replace the many workers who leave the industry due to retirement or other reasons. Opportunities should be best in research and development," (BLS, 2007d). Again, because of Atlanta's knowledge base and local assets like Georgia Tech, the potential exists to capture some of these opportunities.

According to Table 2-11, the average weekly wage for the computer and electronic manufacturing sector is $768. This is a full $200 more than the weekly average for all industries (not just manufacturing).

Table 2-11. Average earnings of nonsupervisory workers in the computer and electronic product manufacturing

	Weekly	Hourly
Total, private industry	$568	$16.76
Computer and electronic products manufacturing	768	18.96
Computer and peripheral equipment	884	23
Audio and video equipment	789	20.33
Communications equipment	776	18.99
Electronic instruments	766	18.89
Semiconductor and other electronic components	711	17.3

Source: Bureau of Labor Statistics: Computer and Electronic Product Manufacturing http://www.bls.gov/oco/cg/cgs010.htm

Table 2-12 provides an occupation-specific breakdown of median hourly wages for the largest occupations in the sector. According to this data, engineers (professional) make significantly more than those engaged in production-related occupations.

Table 2-12. Median hourly earnings of the largest occupations in computer and electronic product manufacturing, May 2006

	Computer and electronic product manufacturing	All industries
Computer hardware engineers	$43.75	$42.54
Computer software engineers, systems software	43.33	41.04
Computer software engineers, applications	43.16	38.36
Electronics engineers, except computer	39.23	38.97
Electrical engineers	38.54	36.5
Electrical and electronic engineering technicians	22.05	24.35
Semiconductor processors	15.76	15.8
Inspectors, testers, sorters, samplers, and weighers	14.32	14.14
Electrical and electronic equipment assemblers	12.25	12.29
Team assemblers	11.73	11.63

Source: Bureau of Labor Statistics: Computer and Electronic Product Manufacturing http://www.bls.gov/oco/cg/cgs010.htm

Motor Vehicle and Parts Manufacturing

According to the BLS, The following points are significant regarding the motor vehicle and parts industry:

- Although approximately 1 out of 5 jobs are located in Michigan, especially the Detroit area, an increasing number are located in other parts of the country, particularly the south.
- Average earnings are very high compared with those in other industries.
- Employment is expected to decline, but retirements will create many job openings. (BLS, 2007e)

Data from this section of BLS analysis might be the most outdated because of the major changes that have played out publicly with the auto industry, including bankruptcy, public bailout, and new public monitoring and regulation. In 2006, the BLS noted that "Despite news of plant closures and unemployed auto workers, the motor vehicle and parts manufacturing industry continues to be one of the largest employers in the country and a major contributor to our economy's success," (BLS, 2007e). The analysis

goes on to suggest, “Motor vehicle and parts manufacturers also have a major influence on other industries in the economy as well. Building motor vehicles requires vast quantities of materials from, and creates many jobs in, industries that manufacture steel, rubber, plastics, glass, and other basic materials,” (BLS, 2007e). Certainly this is true to a certain extent, particularly because the government bailout that was provided to some of the major United States automakers. However, the motor vehicle manufacturing sector has certainly experienced a drop-off beyond what is noted by the BLS. It is also worth mentioning that many automakers producing in the U.S. are not American automakers. A number of foreign automakers now have production operations in the U.S., and these foreign competitors employ a significant number of American workers.

According to BLS numbers, there were over 1.1 million jobs in the motor vehicle industry in 2006, making it one of the largest manufacturing industries. About 61 percent of these jobs were in firms that make motor vehicle parts (as opposed to complete motor vehicles or truck trailers, motor homes, and so forth). The BLS notes, “In 2006, about 30 percent of workers in the motor vehicle and parts manufacturing industry worked, on average, more than 40 hours per week,” (BLS, 2007e). Again, as mentioned earlier in the National Trends section, much of the employment is shifting to new parts of the country. Specifically, “Automotive employment is shifting away from its traditional base in the Midwest to southeastern States, such as Alabama, Mississippi, South Carolina, and Tennessee,” (BLS, 2007e). Georgia recently captured some of this shift when it attracted a new KIA Motors plant, which is located about 75 minutes southwest of the city on the Alabama border. This new plant provides Atlanta with opportunities to house support industries for the KIA plant and other plants in the Southeast.

Table 2-13 in Appendix E gives us a picture of future growth and decline for the motor vehicle industry. Before the financial crisis of the last couple of years, overall employment was projected to decrease 14.3 percent by 2016. Overall industry employment (all industries combined) was projected to grow by 11 percent over the same period. As is the trend with other declining industries, the only occupation estimated to grow was engineering, specifically industrial engineers. While production occupations account for almost 65 percent of the motor vehicle industry’s entire employment, these types of jobs were also expected to decline by 14.4 percent. According to the BLS, even though “projections are for more automobiles and light trucks to be manufactured in the U.S. over this period, productivity improvements will enable manufacturers to produce more vehicles and parts with fewer workers,” (BLS, 2007e).

The BLS summarizes training, advancement, and job prospects: Many jobs in motor vehicle manufacturing have high earnings and good benefits and so are some of the most highly sought after in the country. As a result, standards for entry are high, requiring a strong educational background and the successful completion of tests...Due to the increasingly automated and sophisticated nature of motor vehicle manufacturing and assembly, employers are seeking a better educated workforce. While applicants for assembly jobs may face competition, opportunities will be best for those with a 2-year degree in a technical area...Although employment may be declining, there are expected to be a significant number of openings due to the large number of auto workers who are expected to retire in the coming decade. (BLS, 2007e)

Production workers in the motor vehicle industry who worked for companies that make complete motor vehicles earned an average of $1,213 per week in 2006, making them among the highest paid manufacturing workers in the nation. Similarly, “workers in establishments that make motor vehicle parts averaged $904 weekly,” (BLS, 2007e) Table 2-14 shows an hourly wage breakdown for some of the larger occupations in the motor vehicle industry segment. While supervisors and managers made the most, almost all workers in complete motor vehicle manufacturing earned over $20 per hour. Ages are not quite as high for those working in vehicle body and trailer manufacturing or parts manufacturing. Workers in this industry typically earn substantial pay increases for working overtime, holidays, and weekends.

Table 2-14. Median hourly earnings of the largest occupations in motor vehicle and parts manufacturing, May 2006

	Motor vehicle manufacturing	Motor vehicle body and trailer manufacturing	Motor vehicle parts manufacturing	All industries
First-line supervisors/managers of production and operating workers	$30.98	$20.26	$23.52	$22.74
Inspectors, testers, sorters, samplers, and weighers	25.45	14.4	16.74	14.14
Assemblers and fabricators, all other	25.23	12.52	18.97	12.85
Maintenance and repair workers, general	24.94	16.72	19.84	15.34
Industrial truck and tractor operators	24.92	13.48	15.38	13.11
Laborers and freight, stock, and material movers, hand	24.39	12.02	13.46	10.2
Team assemblers	21.6	13	13.06	11.63
Welders, cutters, solderers, and brazers	20.62	13.68	15.14	15.1
Cutting, punching, and press machine setters, operators, and tenders, metal and plastic	17.36	13.22	13.43	12.66
Machinists	-	15.91	18.27	16.71

Source: Bureau of Labor Statistics: Motor Vehicle and Parts Manufacturing http://www.bls.gov/oco/cg/cgs012.htm

Emerging Industries

The following discussion of emerging industries identifies some of the industries Atlanta may be able to capture in the years ahead. These industries have amorphously definitions and are hard to measure and count. Nevertheless, they are distinguishable by certain characteristics noted in the sections below, and they have a real impact on local economies. Furthermore, several cities in the United States have a good start capitalizing on the benefits of these emerging industries and markets.

Green Industry

The “green” industry is an idea that stretches across many standard industry sectors, including those with ties to industrial land - manufacturing, transportation, and construction. The essence of green industry is to reduce our consumption of resources and pressures on the environment. One of the areas where this has been embraced is where green industry meets “green building.” Essentially, this refers to technology that makes buildings more energy efficient and environmentally friendly. As of 2006, the construction market accounted for approximately 14% of U.S. GDP. Although in the recent downturn this number has fallen, construction remains a vital part of the U.S. economy going forward. One growing component of construction over the coming years will be green building. The green building market has been cited as growing to $60B by 2010. Estimates of the entire construction market in 2015 range from $1T - $3, with anywhere from 10-17% of all construction being identified as “green,” (Green Building Commercial Market Growth). The materials market for green construction, in parallel, is also set to grow at a five percent composite annual growth rate until 2013, reaching $571B by 2013. Wood, insulation, and cement companies have all been noted as manufacturers that will benefit from this growth. Other green building material markets should also be positively affected. This includes, paints, adhesives, glass, and other nonmetal materials manufacturers. (Green Building Materials). Aside from just green building materials, the green industry also includes renewable energy, waste reduction, clean tech, and other support functions.

Life Sciences

The population of the United States is aging and continued attempts to enhance quality of human life have encouraged a surge in the life sciences industry. However, the term life science is loosely defined. It typically refers to bioscience and biotechnology, meaning advances in technology related to biological entities. Thus, the technological advancements coming out of this industry can spur development in food and agriculture as well as pharmaceuticals and medicine. According to John Rhodes of Moran, Stahl & Boyer, "If you tear the industry apart, you will see everything from the new delivery of therapeutics to various types of cutting-edge nanotechnology systems. You'll also see some fairly traditional pharmaceutical products, medical instrumentation, and bioinformatics," (Emerging Industries, Emerging Locations). One drawback to cutting edge life science industries is that they can take years to become profitable and often require subsidies from local governments. New York, for example, currently subsidizes a number of small, local biotech companies (Emerging Industries: Silver

Linings for NYC). Right now the two most recognized clusters for life science- and biotechnology-related industry are Boston and San Diego. Close relationships and partnerships between universities and industry in established life science centers as well as emerging locations are a decisive factor in the success of clusters (The Boston Life Science Cluster). Atlanta is well-positioned to attract life sciences in this respect because of the knowledge base and research capacity of the Centers for Disease Control as well as Georgia Tech and the university's relationship with local and regional businesses.

Nanotechnology

Nanotechnology has increased its exposure over the past twenty years and has been noted as an industry that will continue to make strides. Although nanotech has the ability to extend to all parts of manufacturing at some point in the future, there are nanotech uses today from which companies can greatly benefit and are expected to take advantage of in the near future. Materials ranging from textiles and apparel to metals and plastics have all been noted as benefiting from greater use of nanotech in their manufacturing. Nanotech has been cited in aiding manufacturing processes of televisions, coal to energy conversion, plastic and glass packaging, tool manufacturing, synthetic limbs, sunscreen, paper, textiles, and leather, and metals. Nanobiotechnology has been also cited as making a difference in the manufacturing medicine, pharmaceuticals, diagnostics, industrial processes, and food and agriculture (Hullmann, 2006). The investment potential for nanotech ranges greatly from $150B to $2.4T by 2015. One of the most cited forecasts is $1B by the NSF. In this scenario, Materials may make up over $300B of this and electronics will be just under this amount. Pharmaceuticals and chemical processing combined are approximately $275B (Hullmann, 2006). Again, Atlanta is well poised to capture some of the growth in the nanotechnology industry because of the Georgia Tech Research Institute's Nanotechnology Lab.

Urban Agriculture

Urban Agriculture is re-emerging as an industry with promising growth potential. The August/September 2009 issue of *Planning,* which is published by the American Planning Association, was a special issue devoted to food. It included articles on urban farming, schoolyard gardens, vertical gardens, preservation, world hunger, and efforts to get healthy food into underserved neighborhoods. Many cities in the United States and Canada are taking innovative approaches to bringing healthy, locally grown food back to urban neighborhoods. Some places like Baltimore, Maryland; King County, Washington; the San Joaquin Valley, California; and Marin County, North Carolina have addressed local

food in their comprehensive plans (Hodgson, 2009). The technology, especially, related to urban agriculture has the potential to create exciting local industries related to hydroponics, urban aquaculture, and vertical farming (Flisram, 2009). Many cities have utilized vacant land to initiate urban agriculture products. While this studio has not done a serious study of the amount of vacant land in the city, we do know that several underserved neighborhoods in Atlanta could benefit from healthy, locally grown food products.

Recycling

The most recognizable industry emerging from recycling in the last few years is that of waste to profit. Waste to profit is where one industry's waste becomes another industry's production input. One example of a functioning waste to profit network is in Chicago. Started in 2006, the network includes over 200 companies and institutions reduce waste while creating economic opportunity. The Chicago network has reported results of over 122,000 tons of diverted waste and over $11 million of economic impact to local companies. The network has also been cited as creating or aiding in retention of 35 jobs. Waste included in this process ranged from used cooking oil to ice packs, back into the product stream. The City offers workshops to companies that want to be included in the network. (Chicago Waste to Profit Network) Waste Recycling is not a new form of economic growth, but new technologies have aided what can be included in the recycling process and what is able to be used in a "new life." Job creation from recycling and reuse is far greater than landfill and incineration products. Computer and textile reuse programs have been noted as creating 83 to 296 times the number of jobs per 10,000 TPY than landfills. Recycling has similarly strong job growth impacts, especially for plastics, which can employ over 90 people per 10,000 TPY. (Waste to Wealth) Recycling has a positive effect on government revenues as well. Of the $12.9M in collected in government revenue in 2001, just over 20 percent went to local governments; recycling of ferrous and non-ferrous metals, paper, and plastics made up over 625,000 of the jobs related to the industry (Recycling is Working in the United States).

Local Assets

The following discussion of local assets is an attempt to identify many of the local assets which already exist within the City of Atlanta and that might be beneficial to incoming industry, particularly manufacturing. In fact, this section is really an exercise in classifying stakeholders going forward. Many of our assets do well on their own, but many are also underutilized, and the existing industrial

community in Atlanta would greatly benefit from cooperative participation between these groups in order to make the city a more competitive attractor of manufacturing and other industrial uses.

Universities

Education and research centers include the Georgia Institute of Technology, Emory University, and Georgia State University. Within Georgia Tech, alone, even more local assets exist like the Georgia Tech Research Institute, Marcus Nanotechnology Center, Advanced Technology Development Center, Enterprise Innovation Institute, and more. The Enterprise Innovation Institute is also home to two seriously underutilized assets for manufacturing in the city. The first is the Georgia Manufacturing Extension Partnership, which "provides technical assistance and continuing education to Georgia manufacturers," (Georgia Manufacturing Extension Partnership). The second is the Southeastern Trade Adjustment Assistance Center, which "helps manufacturers develop and implement turn-around strategies to compete better with imports," (Trade Adjustment Overview). All of these research centers lead to agglomeration and spillover effects. Regions surrounding these institutions then reap the economic benefits from technological spillover (Koo, 2005).

Government and Business

Assets related to government and business include the City of Atlanta, Atlanta Development Authority, Metro Atlanta Chamber of Commerce, Georgia Research Alliance, Midtown Alliance, Central Atlanta Progress, Buckhead Business Association, Southface Energy Institute, Green Chamber of the South, Neighborhood Planning Units, and more. Each of these institutions carries a great deal of clout in the city. If they all came together as part of some type of manufacturing stakeholder organization, the results could be immediate and lasting.

Unique Assets

The two unique assets that Atlanta has, assets that cannot be replicated anywhere else in the country, are Hartsfield-Jackson Atlanta International Airport and the Centers for Disease Control (CDC). Hartsfield-Jackson is the busiest passenger airport in the world and, as such, provides many benefits, both tangible and intangible, that are simply not available with other airports. The CDC, similarly, is a one-of-a-kind, world-class research center that both develops and uses some of the leading technology in the world, especially related to chemicals, pharmaceuticals, and other bioscience products.

Appendix A

Table 2-1. Employment of wage and salary workers in aerospace product and parts manufacturing by occupation, 2006 and projected change, 2006-2016. (Employment in thousands)	Employment, 2006	Percent	Percent change, 2006-16
All occupations	472	100	5.4
Management, business, and financial occupations	81	17.2	4.9
General and operations managers	4	0.9	-8.3
Financial managers	2	0.5	1.8
Industrial production managers	5	1	1.8
Engineering managers	10	2.2	12
Purchasing agents, except wholesale, retail, and farm products	10	2	1.8
Cost estimators	2	0.5	10
Human resources, training, and labor relations specialists	3	0.7	10
Logisticians	4	0.8	12
Management analysts	9	1.8	1.8
Business operation specialists, all other	9	1.9	12
Accountants and auditors	4	0.9	1.8
Budget analysts	3	0.6	1.8
Professional and related occupations	147	31.2	8.9
Computer software engineers, applications	12	2.4	22.2
Computer software engineers, systems software	5	1.2	12
Computer systems analysts	3	0.6	12
Aerospace engineers	44	9.3	6.9
Electrical and electronics engineers	5	1	1.8
Industrial engineers, including health and safety	15	3.2	22.8
Industrial engineers	15	3.1	23.7
Mechanical engineers	11	2.3	1.8
Engineers, all other	9	1.8	1.8
Drafters	5	1.1	8.9
Aerospace engineering and operations technicians	4	0.8	1.8
Electrical and electronic engineering technicians	3	0.6	1.8
Industrial engineering technicians	7	1.5	12
Engineering technicians, except drafters, all other	5	1.1	1.8
Office and administrative support occupations	38	8	-3.2
	2	0.5	1.8
Production, planning, and expediting clerks	7	1.6	1.8

Table 2-1. Employment of wage and salary workers in aerospace product and parts manufacturing by occupation, 2006 and projected change, 2006-2016. (Employment in thousands)	Employment, 2006	Percent	Percent change, 2006-16
Shipping, receiving, and traffic clerks	4	0.8	-2
Stock clerks and order fillers	5	1	-14.8
Secretaries and administrative assistants	8	1.8	-0.6
Office clerks, general	4	0.8	0.3
Installation, maintenance, and repair occupations	41	8.7	14.3
Avionics technicians	4	0.9	12
Electrical and electronics repairers, commercial and industrial equipment	2	0.5	8.6
Aircraft mechanics and service technicians	21	4.4	22.2
Industrial machinery mechanics	2	0.5	17.1
Maintenance and repair workers, general	4	0.8	1.8
Production occupations	141	29.9	2.5
First-line supervisors/managers of production and operating workers	9	2	1.8
Aircraft structure, surfaces, rigging, and systems assemblers	24	5.2	12
Electrical and electronic equipment assemblers	4	0.8	-18.5
Team assemblers	7	1.5	1.8
Computer-controlled machine tool operators, metal and plastic	5	1.2	12
Machine tool cutting setters, operators, and tenders, metal and plastic	12	2.6	-6.5
Machinists	18	3.8	6.9
Multiple machine tool setters, operators, and tenders, metal and plastic	4	0.8	12
Tool and die makers	3	0.7	6.9
Welders, cutters, solderers, and brazers	4	0.8	8.3
Inspectors, testers, sorters, samplers, and weighers	16	3.5	-4
Note: Columns may not add to totals due to omission of occupations with small employment			

Source: Bureau of Labor Statistics: Aerospace Products and Parts Manufacturing http://www.bls.gov/oco/cg/cgs006.htm

Appendix B

Table 2-3. Employment of wage and salary workers in pharmaceutical and medicine manufacturing by occupation, 2006 and projected change, 2006-2016. (Employment in thousands)	Employment, 2006	Percent	Percent change, 2006-2016
All occupations	292	100	23.7
Management, business, and financial occupations	47	15.9	26.5
Top executives	6	1.9	13.4
Marketing and sales managers	3	0.9	26
Industrial production managers	4	1.3	26
Natural sciences managers	3	1.1	26
Managers, all other	4	1.3	26
Accountants and auditors	3	1.1	26
Professional and related occupations	81	27.8	26.4
Computer specialists	9	3.2	35.5
Biomedical engineers	2	0.8	38.6
Industrial engineers	2	0.8	53.1
Engineering technicians, except drafters	3	1.2	34.8
Biochemists and biophysicists	4	1.4	26
Microbiologists	3	1.1	26
Medical scientists, except epidemiologists	10	3.4	26
Chemists	15	5.2	13.4
Biological technicians	7	2.5	26
Chemical technicians	7	2.3	26
Sales and related occupations	9	3	25.5
Sales representatives, wholesale and manufacturing	8	2.6	26
Office and administrative support occupations	37	12.5	19.8
Bookkeeping, accounting, and auditing clerks	3	0.9	26
Customer service representatives	4	1.3	38.6
Production, planning, and expediting clerks	3	1.1	26
Shipping, receiving, and traffic clerks	4	1.4	21.3
Secretaries and administrative assistants	9	3.1	20.1
Office clerks, general	3	1.2	24.2
Installation, maintenance, and repair occupations	14	4.8	31

Table 2-3. Employment of wage and salary workers in pharmaceutical and medicine manufacturing by occupation, 2006 and projected change, 2006-2016. (Employment in thousands)	Employment, 2006	Percent	Percent change, 2006-2016
Industrial machinery mechanics	3	1.1	44.9
Maintenance and repair workers, general	6	2.1	26
Production occupations	84	28.6	21.9
First-line supervisors/managers of production and operating workers	8	2.6	26
Team assemblers	5	1.7	26
Chemical plant and system operators	2	0.8	26
Chemical equipment operators and tenders	10	3.5	26
Separating, filtering, clarifying, precipitating, and still machine setters, operators, and tenders	6	1.9	26
Mixing and blending machine setters, operators, and tenders	11	3.6	26
Extruding, forming, pressing, and compacting machine setters, operators, and tenders	2	0.8	26
Inspectors, testers, sorters, samplers, and weighers	9	3	18.8
Packaging and filling machine operators and tenders	20	7	13.4
Transportation and material moving occupations	16	5.3	11.5
Laborers and freight, stock, and material movers, hand	5	1.6	13.4
Machine feeders and offbearers	4	1.4	13.4
Packers and packagers, hand	4	1.4	0.8
Note: Columns may not add to totals due to omission of occupations with small employment			

Source: Bureau of Labor Statistics: Pharmaceutical and Medicine Manufacturing http://www.bls.gov/oco/cg/cgs009.htm

Appendix C

Table 2-6. Employment of wage and salary workers in food manufacturing by occupation, 2006 and projected change, 2006-2016. (Employment in thousands)	Employment, 2006	Percent	Percent change, 2006-2016
All occupations	1,484	100	0.3
Management, business, and financial occupations	62	4.2	-2.2
Top executives	16	1.1	-10.1
Industrial production managers	10	0.7	0.2
Professional and related occupations	26	1.7	3.5
Food scientists and technologists	5	0.3	5.5
Agricultural and food science technicians	5	0.4	-1
Service occupations	60	4.1	4
Cooks and food preparation workers	9	0.6	-0.2
Combined food preparation and serving workers, including fast food	9	0.6	11.4
Counter attendants, cafeteria, food concession, and coffee shop	10	0.7	1.2
Janitors and cleaners, except maids and housekeeping cleaners	23	1.6	4.5
Sales and related occupations	54	3.6	-3
Retail salespersons	17	1.2	-2.6
Sales representatives, wholesale and manufacturing, except technical and scientific products	19	1.3	-0.3
Office and administrative support occupations	105	7.1	-5.9
Bookkeeping, accounting, and auditing clerks	12	0.8	0
Shipping, receiving, and traffic clerks	18	1.2	-3.2
Office clerks, general	12	0.8	-1
Installation, maintenance, and repair occupations	86	5.8	4.9
Industrial machinery mechanics	24	1.6	14.2
Maintenance and repair workers, general	41	2.8	1.2
Production occupations	799	53.8	3.7

Table 2-6. Employment of wage and salary workers in food manufacturing by occupation, 2006 and projected change, 2006-2016. (Employment in thousands)	Employment, 2006	Percent	Percent change, 2006-2016
First-line supervisors/managers of production and operating workers	48	3.2	2
Team assemblers	27	1.8	0.9
Bakers	49	3.3	11.1
Butchers and meat cutters	15	1	13.5
Meat, poultry, and fish cutters and trimmers	106	7.1	12
Slaughterers and meat packers	117	7.9	13.1
Food and tobacco roasting, baking, and drying machine operators and tenders	14	0.9	10.4
Food batchmakers	74	5	8.3
Food cooking machine operators and tenders	24	1.6	-10.3
Separating, filtering, clarifying, precipitating, and still machine setters, operators, and tenders	12	0.8	-4.2
Mixing and blending machine setters, operators, and tenders	24	1.6	-3.2
Cutting and slicing machine setters, operators, and tenders	11	0.7	3.6
Inspectors, testers, sorters, samplers, and weighers	26	1.7	-4.4
Packaging and filling machine operators and tenders	103	7	-11.4
Helpers—Production workers	74	5	5.5
Transportation and material moving occupations	267	18	-9.1
Driver/sales workers	15	1	-9.2
Truck drivers, heavy and tractor-trailer	24	1.6	1.4
Truck drivers, light or delivery services	12	0.8	1.8
Industrial truck and tractor operators	39	2.6	-11
Cleaners of vehicles and equipment	19	1.3	-0.6
Laborers and freight, stock, and material movers, hand	56	3.8	-8.2
Machine feeders and offbearers	14	1	-8.3
Packers and packagers, hand	69	4.6	-18.5
Note: Columns may not add to totals due to omission of occupations with small employment			

Source: Bureau of Labor Statistics: Food Manufacturing http://www.bls.gov/oco/cg/cgs011.htm

Appendix D

Table 2-9. Employment of wage and salary workers in computer and electronic product manufacturing by occupation, 2006 and projected change, 2006-2016. (Employment in thousands)	Employment, 2006	Percent	Percent change, 2006-2016
All occupations	1,316	100	-12
Management, business, and financial occupations	209	15.9	-11.8
Top executives	23	1.8	-19.2
Marketing and sales managers	18	1.4	-13.5
Industrial production managers	12	0.9	-10.3
Engineering managers	29	2.2	-8.3
Purchasing agents, except wholesale, retail, and farm products	20	1.5	-10.7
Accountants and auditors	14	1.1	-11.7
Professional and related occupations	446	33.9	-7.7
Computer software engineers, applications	38	2.9	3.1
Computer software engineers, systems software	46	3.5	-10.1
Computer support specialists	14	1.1	-15.5
Computer systems analysts	13	1	-8.8
Aerospace engineers	14	1.1	1
Computer hardware engineers	32	2.4	-15.3
Electrical engineers	34	2.6	-9.2
Electronics engineers, except computer	36	2.7	-10.7
Industrial engineers	31	2.3	8.7
Mechanical engineers	21	1.6	-8.6
Drafters	9	0.7	-8.9
Electrical and electronic engineering technicians	42	3.2	-10.8
Industrial engineering technicians	15	1.1	-2.8
Sales and related occupations	47	3.6	-12
Office and administrative support occupations	133	10.1	-14.2
Bookkeeping, accounting, and auditing clerks	11	0.8	-9.5
Customer service representatives	15	1.2	-0.2
Production, planning, and expediting clerks	15	1.1	-11.1
Shipping, receiving, and traffic clerks	17	1.3	-14.3
Secretaries and administrative assistants	22	1.7	-13
Office clerks, general	14	1.1	-14.2

Table 2-9. Employment of wage and salary workers in computer and electronic product manufacturing by occupation, 2006 and projected change, 2006-2016. (Employment in thousands)	Employment, 2006	Percent	Percent change, 2006-2016
Installation, maintenance, and repair occupations	38	2.9	-6.5
Production occupations	411	31.2	-16.1
First-line supervisors/managers of production and operating workers	29	2.2	-9.7
Electrical and electronic equipment assemblers	114	8.7	-29.3
Electromechanical equipment assemblers	28	2.1	-8.4
Team assemblers	59	4.5	-8.5
Machinists	15	1.1	-2.8
Inspectors, testers, sorters, samplers, and weighers	36	2.7	-15.6
Semiconductor processors	41	3.1	-13.8
Note: Columns may not add to totals due to omission of occupations with small employment			

Source: Bureau of Labor Statistics: Computer and Electronic Product Manufacturing http://www.bls.gov/oco/cg/cgs010.htm

Appendix E

Table 2-13. Employment of wage and salary workers in motor vehicle and parts manufacturing by occupation, 2006 and projected change, 2006-2016. (Employment in thousands)	Employment, 2006	Percent	Percent change 2006-2016
All occupations	1,070	100	-14.3
Management, business, and financial occupations	63	5.9	-13.8
Top executives	10	0.9	-23.5
Industrial production managers	9	0.8	-13.5
Purchasing agents, except wholesale, retail, and farm products	7	0.6	-18.5
Professional and related occupations	81	7.6	-9.4
Computer specialists	7	0.6	-8.9
Industrial engineers	19	1.8	3.1
Mechanical engineers	14	1.3	-14.4
Engineering technicians, except drafters	15	1.4	-14.9
Office and administrative support occupations	58	5.5	-18.4
Production, planning, and expediting clerks	9	0.9	-16.4
Shipping, receiving, and traffic clerks	12	1.1	-18.9
Secretaries and administrative assistants	7	0.7	-16.6
Construction and extraction occupations	28	2.6	-9.8
Electricians	15	1.4	-9.2
Installation, maintenance, and repair occupations	68	6.4	-10.5
Industrial machinery mechanics	14	1.3	-2.6
Maintenance and repair workers, general	21	1.9	-14.2
Production occupations	688	64.3	-14.4
First-line supervisors/managers of production and operating workers	36	3.3	-13.4
Electrical and electronic equipment assemblers	10	1	-34.8
Engine and other machine assemblers	12	1.1	-13.5
Structural metal fabricators and fitters	7	0.7	-6.3
Team assemblers	201	18.8	-9.5
Assemblers and fabricators, all other	74	6.9	-17.1

Table 2-13. Employment of wage and salary workers in motor vehicle and parts manufacturing by occupation, 2006 and projected change, 2006-2016. (Employment in thousands)	Employment, 2006	Percent	Percent change 2006-2016
Computer-controlled machine tool operators, metal and plastic	14	1.3	-10.1
Forming machine setters, operators, and tenders, metal and plastic	11	1	-29.2
Machine tool cutting setters, operators, and tenders, metal and plastic	62	5.8	-25.1
Machinists	28	2.6	-13.9
Molders and molding machine setters, operators, and tenders, metal and plastic	13	1.2	-26.8
Multiple machine tool setters, operators, and tenders, metal and plastic	18	1.7	-11.6
Tool and die makers	21	1.9	-13.2
Welders, cutters, solderers, and brazers	36	3.4	-2.6
Welding, soldering, and brazing machine setters, operators, and tenders	13	1.2	-5.9
Inspectors, testers, sorters, samplers, and weighers	33	3	-20
Painters, transportation equipment	10	1	-8.1
Transportation and material moving occupations	65	6.1	-22.4
Industrial truck and tractor operators	23	2.2	-23.9
Laborers and freight, stock, and material movers, hand	21	2	-22.8
Note: Columns may not add to totals due to omission of occupations with small employment			

Source: Bureau of Labor Statistics: Motor Vehicle and Parts Manufacturing http://www.bls.gov/oco/cg/cgs012.htm

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Industrial Real Estate in Atlanta

Atlanta's Industrial Real Estate – Supply and Demand

In this section of our report, we analyze the existing supply of industrial land and real estate in the City of Atlanta and compare it to the metro area, several cities with which we compete, and other cities that have leading industrial protection policies.[1] We then examine the demonstrated demand for industrial real estate by looking at data that the Atlanta Development Authority and the Metro Atlanta Chamber of Commerce made available for our review. In terms of demand, we also look at the space and other site location requirements from industries identified in *The Industrial Sector in Atlanta* to determine whether such needs can be met in the City of Atlanta. Finally, we conclude by offering best practices in industrial real estate identified from other communities and relate our real estate findings into a series of preliminary recommendations to the City of Atlanta.

[1] For comparative purposes, the following cities were chosen: Competitive set - Houston and Dallas as leading inland port industrial locations. Cities with leading industrial policies - Los Angeles, Minneapolis, New York and Seattle. Information is not available for all of these cities in each table but has been provided whenever possible.

Supply

Total Land

Like many cities, Atlanta's supply of industrial real estate is dwindling due to development pressure. Currently, Atlanta has 7% percent of its land use designated for industrial (See Table 5.1a). This equates to a 12% loss of acres between 2004 and 2009. Other cities have seen comparable loss of acres as a percentage of total land in the city, with some cities like Los Angeles losing 26% of its industrially zoned land.

Table 5.1a

Cities	Acres of Industrial	Percent of total land
Atlanta	5,902	7%
Los Angeles	14,093	6%
Minneapolis	3,987	16%
New York	6,101	4%

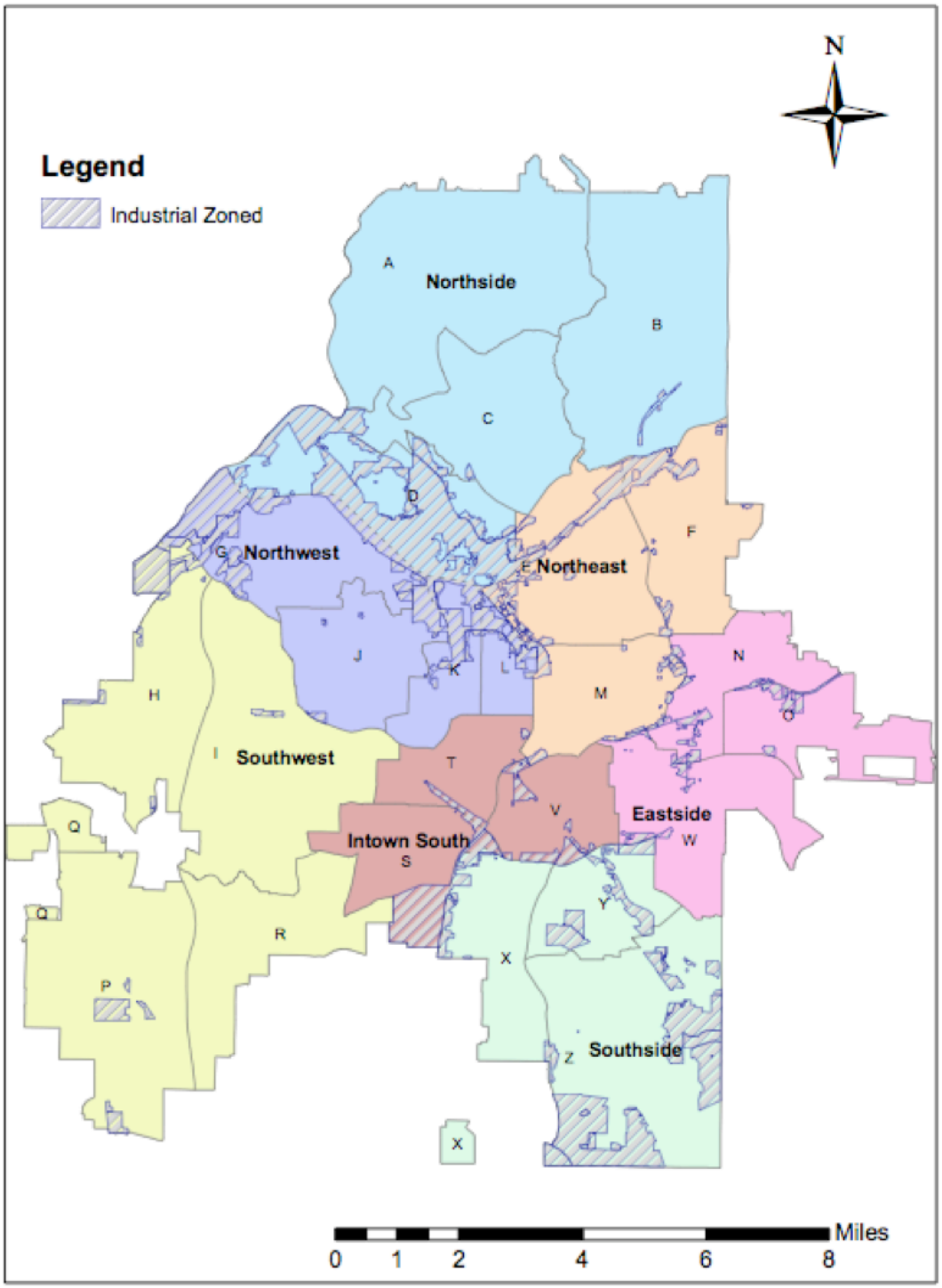
Source: Los Angeles' Industrial Land: Sustaining a Dynamic City Economy, December 2007. Atlanta data from Bureau of Planning, July 2009.

With 5,902 acres of industrial land, Atlanta falls in the middle relative to other cities in terms of total land. Within the city as a whole, industrial land is highly concentrated, with the largest land areas in the Northside/NW and Southside Study Areas (see Figure 5.1a). The Northside/NW Study Areas combined have seen the most manufacturing activity, as 67.7% of all manufacturing establishments in the City of Atlanta are located here.[2]

[2] Source: US Census. County Business Patterns, 2006, retrieved July 2, 2009. http://www.census.gov/econ/cbp/index.html for the following zip codes in the City of Atlanta: 30306, 30307,30309, 30307, 30311, 30314, 30315, 30316,30317,30318,30324 and 30354

Figure 5.1a

Location of Industrial-Zoned Land in the City of Atlanta, 2009



The Northside/NW area is also the highest-priced industrial submarket in terms of lease rates. In the combined Chattahoochee/Central area (the Co-Star submarket area that most closely corresponds to the geographic area the city refers to as Northside/NW), the lease rates are significantly higher than in South Atlanta (see Table 5.2a).

Table 5.2a

Sector	Chattahoochee/Central	Airport/South Atlanta	Atlanta MSA
Manufacturing	$10.18	$2.99	$3.85
Warehouse/Dist.	$4.16	$3.37	$3.57
High Tech	$13.25	$8.43	$11.34
Office Service	$13.50	NA	$8.68

Cushman & Wakefield, Market Beat, Atlanta Industrial Report 2Q09. Direct weighted average, net rental rates.

Building Supply

The Atlanta MSA currently has manufacturing stock of over 16 million square feet of space and a total of over 508 million square feet industrial (including warehouse/distribution, leased industrial and manufacturing. See Table 5.3a). With only 3.2% of total industrial as manufacturing space, Atlanta has less of its industrial space dedicated to manufacturing use than the national percentage which is 13.1%.[3] Overall, Atlanta's MSA industrial building inventory has increased over 21.5% in the ten years between 1999 and 2009. *Source: Jones Lang LaSalle, Winter 2009.*

Table 5.3a

Metro	Total Manufacturing Stock in Square Feet	Total Industrial Stock in Square Feet
Atlanta	16,432,560	508,597,718
Chicago	147,042,221	970,542,953
Houston	19,791,033	349,129,061
Dallas	17,212,252	530,072,258

[3] Figures derived from Jones Lang LaSalle (Winter 2009).

Looking specifically at the City of Atlanta's total industrial space for lease, there are over 42 million square feet of industrial in the Chattahoochee/Central area and over 147 million in the South Atlanta/Airport market. The South Atlanta/Airport figure, it should be noted, includes significant property outside of the City in Clayton County.

In terms of vacancy, Atlanta's manufacturing and total industrial vacancy is slightly higher than the national average. There is a large difference between vacancy in the Chattahoochee area and in Southside indicating significant availability in the South and a tighter market in the Northwest (See Table 5.4a). Overall, Atlanta's industrial vacancy is far above other more supply-constrained markets such as Los Angeles and New York whose vacancy can run as low as 1.5%.

Table 5.4a

Metro	Manufacturing Vacancy	Industrial Vacancy
Atlanta Chattahoochee Southside	10.4%	12.3% 6.0%* 14.3%*
Chicago	14.1%	11.1%
Houston	1.9%	5.7%
Dallas	10.4%	10.0%
TOTAL US	10.0%	8.9%

Metro statistics from Jones Lang LaSalle, United States Industrial Report, Winter 2009. Submarket detail from CoStar MidYear Report 2009.

Despite the demonstrated supply and availability of industrial land and buildings in Atlanta, there is a mismatch in terms of the building inventory and building requirements for many twenty-first century industrial users. For example, in the City of Atlanta there are currently less than 10 properties that are being marketed at over 100,000 square feet in the industrial space. In comparison, there are 191 properties over 100,000 square feet in the Atlanta metro region.

Table 5.5a offers examples of how Atlanta compares (as a metro) to other cities in terms of large building stock.

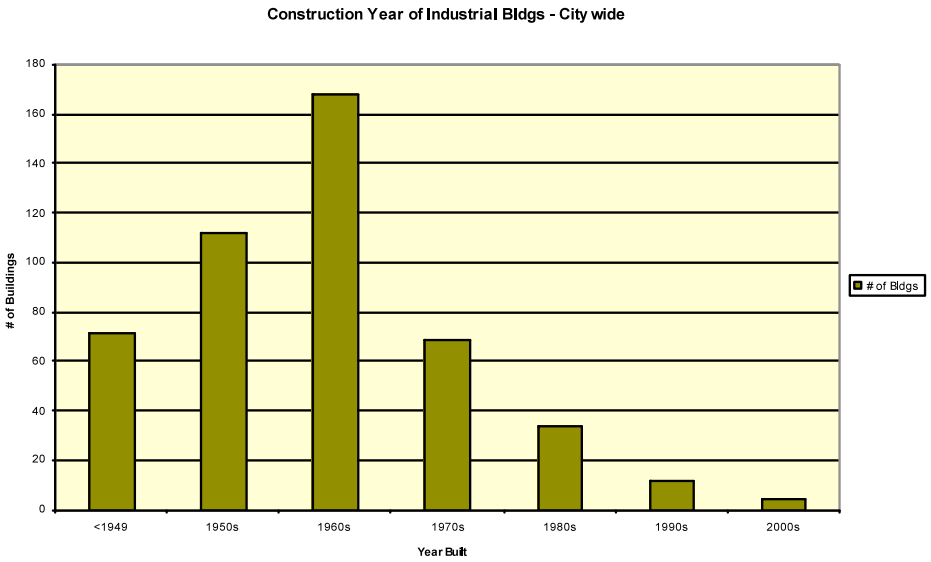
Table 5.5a

Metro Area	Number of Industrial Facilities >100K
Atlanta	191
City of Atlanta	<10
Seattle	37
Chicago	317
Dallas	130
Houston	96
Los Angeles	239

North American Industrial Location Index, September 2008. Data compiled Jne 2008.

Much of Atlanta's building stock is aged and likely obsolete given today's industry requirements. For buildings over 75,000 square feet, 37% were built before 1970 and another 28% were built before 1990. The chart in Table 5.6a below provides a representation of our entire building stock (all sizes) and underscores that the vast majority were built more than forty years ago.

Table 5.6a



Source: City of Atlanta, Bureau of Planning, Industrial Policy Meeting, January 2008. Powerpoint presentation.

The reuse of older and relatively small industrial buildings in Atlanta is an ongoing challenge. Manufacturing requirements and equipment are product specific, but there are occasions when it is possible to retain the building shell and bring in updated equipment. It is also possible to use older warehouses with low ceiling heights and inadequate docks for local distribution, particularly for service part logistics and other industrial and commercial business support services that need to locate near their client base. It is possible that today's tight capital markets may result in more interest in renovation projects as they are easier to finance than new development.[4]

Active Marketing

Currently, Co-Star lists over 773 acres of industrial land available for sale (land suitable for industrial development, though this includes commercial). The largest parcel currently being marketed is 62 acres and the average parcel size is 3 acres. Relative to other cities, these are small parcels and represent a competitive challenge for attracting large space users to the City of Atlanta. While the above statistics do not offer a complete picture of industrial land in Atlanta, they do offer a snapshot of what is being offered on the market as of October 2009.

Demand

Trends in Industrial Real Estate

While the image of industrial property continues to conjure up smokestacks and pollutants, there is no doubt that industrial real estate definitions are changing. In fact, many industrial business in the 21st century do not require industrial land use or zoning. According to Urban Land Institute (ULI), many communities prefer to recruit light/high tech industrial and are encouraging the movement of large manufacturing outside the city where there is cheaper land and fewer zoning restrictions (Peiser, 2003). Consequently, the industrial real estate market has evolved into multiple categories with vastly different cost structures and location requirements. Cushman and Wakefield, for example, distinguishes its industrial real estate as High Tech, Office, Warehouse & Distribution and Manufacturing. As seen in

[4] Phone Interview with Tripp Eskridge, Vice President, Jones Lang LaSalle. October 29, 2009.

Table 5.3a, in a given submarket, high- tech space commands a significant premium over warehouse space, as much as two to three times higher.

A second trend for some of the emerging industries, such as alternative energy or fuel cell production, is a transition from the need for mostly R&D real estate to one for manufacturing, as the commercialization of products becomes increasingly viable. Because this is such a new industry sector, there are no green industry standards for real estate. For fuel cell production, space needs range from 25,000 square feet to 100,000 square feet. This type of manufacturing can locate in flex space where there is office, clean room and manufacturing. The infrastructure required is reliable electricity, water and sewer, access to multi-modal transportation, including rail spurs in the case of large, stationary fuel cell product that needs to be moved by rail car (Sabrsula, 2008). In addition to the requirements above, key site location criteria include access to financing and quality of life for employees. Another significant factor is supply chain availability that allows the manufacturing facility to source difficult to locate components.

Food manufacturing is an industry that is growing as well. While it may not be "green" in nature, food manufacturers locate in industrial areas and are highly dependent on location. According to industry experts, large-scale food distribution is one of the few "recession-proof" commercial/industrial industries in the current economic climate (Schoolcraft, 2009). In addition to the large regional distribution centers, there are also smaller food manufacturers who can choose to engage in sustainable practices by locating close to raw products and their customer base simultaneously, lessening their carbon footprint and decreasing costs at the same time. Beside food manufacturers, other time sensitive industries that tend to cluster or co-locate include garment manufacturing, printing, wholesale flowers, machinery parts and commercial grocers (Peiser, 2003).

Estimates of Demand

It is challenging to determine the overall demand for industrial and/or manufacturing space in the City of Atlanta. A 2008 Market Study conducted by RCL Co and designed to measure demand by category of land use surrounding the Beltline, estimates that industrial market demand between 2005 and 2030 will decline overall by 1,035,303 square feet.[5] The RCL Co Study looked at only Warehouse, Flex and

[5] RCLCo (2008). Update of Market Forecasts for Atlanta Beltline Study Area; Atlanta, GA.

Distribution space and did not include manufacturing space. They arrived at this figure by taking employment projection figures for the period and applying a formula that takes into account the number of square feet of industrial land per employee and the historic intown absorption as a percent of metro Atlanta. In the final presentation, they presented a chart (See Table 5.7a) that shows the amount of Flex, Distribution and Warehouse space that will be required in five year increments with and without policy intervention. According to RCL Co calculations, there will be demand for Warehouse space in the City but little demand for Distribution and Flex Space without a market intervention.

Table 5.7a

INDUSTRIAL DEMAND BY 5 YEAR INCREMENTS

YEARS	FLEX SPACE DEMAND MARKET-DRIVEN	FLEX SPACE DEMAND POLICY INTERVENTION	DISTRIBUTION SPACE DEMAND	WAREHOUSE SPACE DEMAND	INDUSTRIAL DEMAND MARKET-DRIVEN	INDUSTRIAL DEMAND POLICY INTERVENTION
2005 - 2010	(272,579)	(259,553)	(384,773)	457,886	(199,466)	(186,440)
2010 - 2015	(321,171)	(209,305)	(453,364)	539,511	(235,024)	(123,159)
2015 - 2020	(270,843)	(54,021)	(382,322)	454,970	(198,196)	18,626
2020 - 2025	(336,528)	78,110	(475,043)	565,309	(246,262)	168,376
2025 - 2030	(315,499)	213,241	(445,358)	529,983	(230,873)	297,866

Reprinted from RCL Co, January 2008, Update of Market Forecasts for the Atlanta Beltline Study Area.

Almost 20% of the industrial land, designated in the future land use map, is in the Beltline Planning Area. In January 2008, the Bureau of Planning evaluated nine sub-areas near the Beltline or a total of 1,444 acres of the then total 7,282 acres classified as industrial in future land use. Based on the RCL Co study and other criteria, the following recommendations were made for the industrial land in the Beltline Planning area: Further Analysis Needed (397 acres), Long-Term Industrial (547), Future Redevelopment (742), Immediate Redevelopment (894) or Mixed Use Industrial (164). [6] These recommendations should be monitored carefully in the upcoming years as development patterns emerge and the areas that are being encroached upon become ever more apparent.

[6] These recommendations were made in a meeting, (January 30, 2008). Department of Community Development. Bureau of Planning . Industrial Policy Meeting. City of Atlanta.

Another indication of a decline in demand for manufacturing real estate can be seen in an analysis of manufacturing establishments in the City of Atlanta. Between, 1998 and 2006, there was a 19.5% decline in the number of manufacturing establishments in the City of Atlanta.[7]

Requests to Atlanta Development Authority and Metro Atlanta Chamber

Another way to document demand is to review the leads that have been processed by the local economic development agencies. In the past two years, the Atlanta Development Authority (ADA) has recorded inquiries from over 200 entities. It is notable that of the 204 requests, over 49% were from industrial users. There is not complete data on the real estate requirements that accompanied these requests, however, we can derive average real estate requirements as itemized below to get an idea of the size of space being requested (See Table 5.8a).

Table 5.8a

	Number of inquiries	**Real Estate (average request)**
Manufacturing	20	109,100 s.f.
Life Science	30	42,105 s.f.
Recycling & Waste	7	45,875 s.f.
Food Mfg	8	99,000 s.f.
Other industrial	41	

Source: Atlanta Development Authority Leads, 2007-2009

Overall, in the industrial space, requests ranged from small 1,000 s.f. requests for life science/research spaces to 500,000 s.f. for a manufacturing facility

Table 5.9a

Type	**Low s.f.**	**High s.f.**	**Average s.f.**
Manufacturing	**2,500**	**700,000**	**166,754**
Manufacturing and Distribution	**4,000**	**1,000,000**	**182,553**

[7] Bureau of Labor Statistics, County Business Patterns (2006) for NAICS codes 311, 312, 314,315, 316,321,322,3232,324,325,326,327,331,332,333,334,335,336,337 and 339. Data retrieved July 7, 2009. Http://www.census.gov/econ/cbp/index.html

for sustainable technology used in solar cars. In terms of acreage, with the exception of one very large space request, the majority of the requests were between 2 and 50 acres.

Food Manufacturing	**30,000**	**300,000**	**123,750**
Clean Room	**7,500**	**7,500**	**44,550**

At the Metro Chamber, over 1600 requests for site location have been received in the past five years. Again, there are a substantial number of requests from industrial users totaling over 19% of all inquiries.[8]

Source: Metro Atlanta Chamber of Commerce, Lead List, 2004-2009

In Table 5.9a, we have included the low and high range of space requested, as well as the average, for industrial space uses requested of the Chamber in the last five years. While there is a large variation in these numbers, the average manufacturing request is over 100,000 square feet. Food manufacturing and clean rooms have smaller footprints.

City of Atlanta Facility Needs

One of the most significant users of industrial land in the City of Atlanta is the City's own operating departments. Public Works and Watershed are two departments that own and/or manage significant industrial land. As several of the current operating departments are sited near the Beltline, they may put under pressure by future development.

In 2007, the City assessed the growth needs for the various operating departments and determined that the total space needs for Solid Waste, Parks Maintenance, Construction Maintenance, Parking Services and Motor Transport was 117,000 square feet and 25 acres.

Acreage	Square Feet
25	117,000

[8] Industrial users for MACOC are all uses coded with NAICS 31-33.

This number does not tell us the total amount of land used by the City's operating department or suggest efficiencies that could be achieved by consolidation, something that is certainly worth further investigation.

Best Practices

Two best practices stood out from our research about how other cities promote their industrial real estate.

Searchable databases

Top-tier cities offer publicly available, searchable databases so that space users and site consultants can identify the city's offerings. While many of these users have access to similar databases, such as Co-Star, the benefit of the customized database is that it is branded for the city and includes verified information on the sites, something that Co-Star is not able to provide. The challenge with such a system is that it requires staff attention to constant updating of the property information, though other types of information, such as demographics, can be automatically updated through subscriptions to proprietary databases.

One example is Siouxland in the tri-state area of Iowa, Nebraska and South Dakota which hosts a fully searchable tool on its economic development site. (http://www.sidyn.com/siouxland/). While this tool is not designed exclusively for industrial buildings and land – it includes commercial properties as well – it is able to provide the detailed site conditions that an industrial user demands.

Pre-Certification Programs

Several communities have pursued a strategy to market industrial properties through a Pre-Certification or Shovel Ready type of program. These programs certify that the sites have all approvals for major permitting and that building can proceed without delay. New York's Build Now and North Carolina's Certified Site program are two statewide programs that have clearly identified criteria for their programs. According to its website, North Carolina's Certification means " a property has undergone rigorous testing to ensure that it is ready for development."[9] North Carolina offers a faster start to companies that choose a pre-certified site along with the following benefits:

[9] . "North Carolina's Eastern Region." Retrieved October 11, 2009, from www.nceast.org.

- Phase I environmental audit
- Geo-technical studies
- Topographic analysis and map
- Aerial photography
- Availability of public utilities
- Industrial quality power
- Engineered site development plans
- Detailed analysis of development cost
- Competitively priced
- Marketed for Business/Industrial use

The New York program is noteworthy for two reasons. New York offers Shovel Ready status along with an extensive online self-evaluation tool for developers to determine readiness and apply for this status. What makes the New York program more powerful, however, is that there is an associated program called BuildNow that makes funding available to take a site through this process. Between 1998 and 2008, the State has distributed over $4 million to assist communities in pre-certifying their sites. According to the BuildNow website, this $4 million has yielded over 12,700 jobs on BuildNow sites. [10] Through BuildNow, funding is available to assist with:

- completing a State Environmental Quality Review (SEQR)
- ensuring proper zoning and park covenants
- undertaking historic and archaeological surveys
- completing engineering studies, site maps, development plans, and related items
- performing soil sampling, test borings, and related items
- designing and engineering public infrastructure installation or upgrades

Most recently, matching grants up to $100,000 were offered for pre-certification work and 23 additional BuildNow sites were added to the inventory. This last round of funding was targeted to the development of high-tech manufacturing, warehouse/distribution/logistics and multi-tenant business and technology parks.

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[10] The Build Now-NY Pre-Permitting Concept." from http://www.gorr.state.ny.us/BuildNow-NY/buildnow.htm. Retrieved October 26, 2009.

In Georgia, GRAD or Get Ready for Accelerated Development, a program of Georgia Allies through the Department of Economic Development, offers a similar program but with several drawbacks for the City of Atlanta. For example, GRAD sites must be a minimum of 50 acres. In addition, there is no apparent funding program to incentivize a landowner to become a GRAD project. According to the website, there are only five properties that are certified GRAD in the State of Georgia. The five current properties are all greenfield sites and none are in the metro area. [11]

Certification or pre-certification programs can be an effective differentiator for economic development, however, they require ongoing monitoring by the agency. Further investigation is warranted to see if the City of Atlanta could develop a similar program to certify and market its industrial properties and/or apply for funding through the State program.

Preliminary Recommendations

The data presented above, combined with information from interviews with economic development personnel, industrial real estate site specialists and other consultants during the background phase of this Studio, suggest that it will remain difficult for the City of Atlanta to compete for large industrial space users due to its higher land cost and the higher real and perceived cost of doing business in the City. There may be some opportunity to capitalize on the significantly lower land and lease rates that are available on the southside of Atlanta, particularly around Southside Industrial Park, but other opportunities are extremely limited.

Rather than competing for large manufacturing assignments, the quantitative and qualitative data suggest that the City of Atlanta focus on the area that is already its strength – small and mid-size companies. According to a review of all manufacturing businesses in the City, 94% of current businesses

[11] "Georgia's Shovel Ready Sites are GRAD Approved." from http://www.locationgeorgia.com/GRAD_Sites.php. Retrieved October 26, 2009.

in the City of Atlanta have under 100 employees.[12] Given the existing building stock that serves this population and the smaller parcels that could support new construction, it would make sense for the City to focus on learning more about its small to mid-size users and whether or not they form industry clusters that warrant specialized attention. The strategy of focusing on industrial districts made up of specialized support services is one that is currently being pursued in Los Angeles and in San Francisco as well.[13] Industrial land is attractive to small, and especially entrepreneurial businesses that require low rent, small spaces and business incubator space.

Another finding worthy of pursuit in the second half of our Studio is that some of the green industries that are well represented in past inquiries to ADA and the Chamber – life sciences and food manufacturing for example– can be modest space users that would fit with the City's existing stock. As a next step, we recommend an ongoing search for other green industries that can work in a similar footprint.

[12] Bureau of Labor Statistics, County Business Patterns (2006) for NAICS codes 311, 312, 314,315, 316,321,322,3232,324,325,326,327,331,332,333,334,335,336,337 and 339. Data retrieved July 7, 2009. Http://www.census.gov/econ/cbp/index.html

[13] See Department of City Planning and the Community Redevelopment Agency of the City of Los Angeles, "Los Angeles' Industrial Land: Sustaining a Dynamic Economy," December 2007 and Back Streets Businesses Advisory Board, "Made in San Francisco: The Role of Back Streets Businesses in providing jobs, serving Main Street businesses and local residents, and in the larger city economy – and what the City of San Francisco can do to retain and expand them," December 2007.

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Real Estate – Understanding Atlanta's Industrial Areas

The twelve percent (12%) reduction in industrially zoned land over the past five (5) years is an indication that Atlanta's industrial areas are in danger. The pressures will continue, but there are lessons to be learned from others that have experienced similar unacceptable rates of industrial land loss (see Table 5.1b for loss comparisons). Chicago's implementation of planned manufacturing districts in 1990 was preceded by considerable concerns of increasing residential and commercial pressures on key industrial areas (Rast, 2001, p. 185). The loss of thousands of acres of industrial land in Los Angeles also caused its leaders to create an industrial corridor program (LA, Attachment A, 2007). Planners in Washington, D.C. clearly believed that the District's zoning policy failed at protecting industrial areas from incompatible land uses when they called for a complete revision of the zoning framework in 2006 (D.C., 2006, pp. 6-8). The Philadelphia Industrial Development Corporation (PIDC) is participating in an industrial land plan because Philadelphia is running out of marketable industrial land (Dalfo, 2009). Other cities' experiences should not be overlooked. The pressure of land use changes and demand will be a significant challenge to any future industrial policy for Atlanta.

Table 5.1b: Lost of Industrial Land of Selected Cities

Cities	Amount of Industrial Land Lost (acres)	Relative Percent of Loss
Los Angeles[1]	4,922 (?-2002)	26%
Minneapolis[2]	869 (1990-2000)	18%
New York[3]	1,797 (2002-2007)	14%
Atlanta[4]	**800 (2004-2009)**	**12%**
San Jose[5]	1,400 (1990-2008)	9%

Sources:
1. City of Los Angeles. (2004).
2. City of Minneapolis. (2006).
3. The Pratt Center for Community Development. (2009).
4. See previous section discussing the GIS analysis.
5. City of San Jose. (March 21, 2008).

Much like the cities that have already implemented supportive industrial land use policies, the loss of Atlanta's industrial areas and the fear of not having enough land for existing, new, and expanding businesses are motivators for action. Deciding which areas are worth preserving is a critically important

step in future policy decisions. As such, the following section introduces the studio class's recommended organizational scheme for identifying and evaluating Atlanta's industrial areas.

In September, the studio class had the opportunity to personally observe several industrial areas across Atlanta. Participants during the site tours used a simple field tool to note observations. A summary of the observations for each site is available in the Appendix. The observations were reviewed based on four (4) criteria. The organizational scheme of evaluating areas was developed after the review of several reports addressing industrial uses in Atlanta as well as eight (8) other cities. The concept of organizing an area's various real estate and logistic attributes by its form, function, marketability, and public priority arose from the recognized needs and concerns that were common to all the reviewed plans.

Form

Referring back to the discussion of conceptualizing types of industrial areas, it is important to note the role and relevance boundaries, buffers, and transitional areas have in stabilizing industrial areas. A widely recognized concern from the case cities was the encroachment of incompatible land uses (especially residential) into industrial areas. For instance, a review of Atlanta's neighborhood planning units' (NPUs) land use policies in the comprehensive plan revealed that all but six (6) of the twenty-five (25) NPUs mentioned boundary and buffer related issues with industrial use (see Table 5.2b). Some NPUs, such as NPU-W, stated boundary restrictions for specific major industrial facilities of concern. NPU-R even prescribed that industrial land uses in the neighborhood should be restricted only to industrial park-like settings (Atlanta, 2003, pp. 20.27-20.42).

Table 5.2b: Examples of Specific Recognition by NPUs for Boundaries and Buffers Between Industrial Uses and Other Uses from Atlanta's Comprehensive Plan

Only retain industrial uses that are compatible with their surrounding development patterns
Provide landscape or architectural buffers to minimize industrial areas impact on residential areas
Maintain the boundaries of existing industrial uses and prevent encroachment of these uses into adjacent residential areas
Introduce a transitional buffer zone between single-family uses and industrial uses
Prohibit the expansion of industrial uses into the existing surrounding residentially zoned areas

Source: City of Atlanta. "2004-2019 Comprehensive Development Plan." (December 2003).

Policies addressing the physical setting of industrial areas were common in the reviewed reports. The City of Los Angeles master plan limited the conversion of industrial land into other land uses to prevent the "…fragmented pattern of development [that] reduces the integrity and viability of existing industrial areas."[1]

[1] City of Los Angeles. "General Plan Framework." Section 7.2.11. (1996, 2001), quoted in City of Los Angeles. "Los Angeles' Industrial Land: Sustaining a Dynamic City Economy - Attachment B." Department of City Planning and The Community Redevelopment Agency. (December 2007): 3. http://cityplanning.lacity.org/.

In Minneapolis, policymakers heeded the recommendation of the industrial land use plan and drew physical boundaries to prioritize industrial uses and to strongly discourage residential uses. It was determined that any zoning effort in Minneapolis would fail to protect industrial uses without strong, clear boundaries around areas (Minneapolis, 2006, pp.72-73). The amount of requests for changing industrial zoning prompted Seattle's mayor in 2004 to request a complete overhaul on how the City plans for its industrial land (Seattle, July 2007, p. 1).

The ability for an industrial area to accommodate expansions, different types of operations, and the facilities of the future is also an important element to understand when evaluating form. The concept of flexibility was found to be extremely important for long-term and sustainable industrial development in the case cities. Minneapolis's industrial land use plan specifically stated, "Flexibility will be the key feature for industrial development in the future" (Maxfield, 2006, p. 97). Minneapolis has determined that changes to manufacturing will directly impact future industrial land demand so methodologies of rationally making land use decisions based on industry projections were incorporated in its plan (Maxfield, 2006, pp. 114-115). In Seattle, interviews with businesses revealed that land constraints preventing the ability to expand operations were one of the top five concerns for making location decisions (Seattle May 2007, 50). Los Angeles planners were guided by the principle that their industrial areas should "allow for agility in responding to the market" (LA, Attachment B, p. 32).

Form is integral to protecting the spatial qualities of successful industrial areas. Boundaries, buffers, and transitional areas affect how well industrial areas interact with surrounding neighborhoods. Furthermore, stable industrial areas instill confidence in businesses, and policies securing areas show businesses that they are a priority. Cities have also found that planning for industrial areas may address the growing concerns of land and space flexibility. Though suggestions on the most efficient size of an

industrial area were not mentioned in the reviewed industrial plans, it was apparent that cities are more concerned about planning areas (i.e., several contiguous acres) than points or individual parcels. A planned manufacturing district in Chicago, for example, can be as little as five (5) acres to several thousand acres. Philadelphia's existing fifteen (15) industrial districts contain 88% of the approximately 18,000 acres of industrially zoned (PIDC, 2009). The balance of Philadelphia's industrial land is scattered and is comprised of various parcel sizes. Smaller parcels will more than likely be converted to other uses in the future (Dalfo, 2009).

Function

The survival of an industrial area and its businesses will depend on how well the area functions. Compatibility among the businesses, access to suppliers and customers, and service by adequate transportation infrastructure (especially road circulation) and utilities all contribute to doing business well in an area. These aspects of function are included in the following summary because they were commonly found in the consulted industrial land studies. Understanding and profiling an area's function is extremely difficult and complex, requiring expertise from various sources and flexibility in approach. Though this summary is not meant to be inclusive of all the studies' nuances, it does highlight the considerable attention cities place on evaluating function during industrial planning. Characterizing Atlanta's industrial areas without regard to how well they function may jeopardize policies and the credibility of the entire planning process.

Compatibility was a critical planning component for all the case cities. There were indications from all the case cities that excessive amounts of retail and commercial uses, and certain industry mixes compromised industrial areas. A common approach to ensuring compatibility was through zoning. Subsequently, evaluating areas included some manner of comparing zoning with existing conditions. Codified zoning requirements that involved a hierarchy of industrial uses based on process type and intensity was a common approach to ensure the right mix of industry in an area. Chicago's zoning for planned manufacturing districts was a good example of this approach. New York's zoning code for manufacturing districts limited the type of uses to prevent noxious activities but it allowed for large-scale retail and even hotels (New York City, 2009). Allowing for such use exemptions in active industrial areas has been criticized by proponents for stronger industrial land use policies (The Pratt Center, 2009).

[2] City of Chicago. Municipal Code of Chicago. §16-8-020(d).

Designating uses to prevent conflict was also necessary where industrial areas may have pre-existing commercial, residential, or other land uses. Philadelphia, which is currently undertaking an industrial land use plan, is dealing with this issue by considering the right scale of industry in areas that contain a mix of industrial, commercial and/or residential uses (Dalfo, 2009).

The study supporting future industrial policies in Philadelphia also found that industrial facilities preferred not to operate in isolation (Dalfo, 2009). Many of the case cities considered the clustering of industrial users as an indication that several area components were correctly working; thus, the areas were assumed to be worth protecting. The City of Los Angeles analyzed industrial areas for "cores" where industries were clustered and concentrated. These areas were not only a priority for the City to protect, but it also helped focus special attention to capture and foster agglomeration benefits of certain targeted industries (LA, 2004, p. 28; LA, Attachment B, 2007, p. 30).

Table 5.3b: Examples of Specific References to Compatibility and Function from Case Cities

Chicago	Permits only industrial uses and compatible uses[1]
Los Angeles	Allow an array of uses, (retail included), within industrial areas that are supportive of each; Special attention was given to districts with particular industry clusters or specialized linkages (agglomeration)[2]
Minneapolis	Performed clustered analyses to discover existing strengths and industry compatibilities[3]
New York	Identified mutually beneficial linkages between manufacturers and seemingly unrelated industries[4]
Seattle	Determined that small retailers and commercial establishments are important to an industrial area's function but their sizes, use, and amount must be restricted[5]
Washington, D.C.	Defined healthy industrial areas as containing a concentration of compatible businesses[6]

Sources:
1. City of Chicago. Municipal Code of Chicago. Chapter 17-5.
2. LA Attachment B 2007, 30; 34.
3. Maxfield 2006.
4. The Pratt Center Vol. I 2001, 17.
5. Seattle July 2007, 15.
6. D.C. 2006, 76-77.

Access to suppliers and customers was a critical focus for many cites. The District of Columbia spent considerable attention on the linkages and the advantages of co-locating buyers (users of products) and suppliers (D.C., 2006, pp. 19, 26-34). Proximity to customers and suppliers was also found to be the biggest advantage to locating in an area (Seattle, May 2007, p. 30; D.C., 2006, p. 30). Linkages between manufacturers and other industries such as publishing, advertising, and marketing (industries in which Atlanta has strengths) were recognized to be mutually beneficial (The Pratt Center, Vol. I, 2001, p. 20-21). Manufacturers were also found to be linked to research institutions (Minneapolis, 2006, p. 3). Overall, the geographical proximity of businesses with operational relationships was an important element to understanding how well an industrial area functions.

A final aspect of compatibility found to be common in the case cities, was the mixing of uses and property values. Co-locating high technology firms, retailers, and other commercial users in industrial areas was found to potentially cause increases in

property values and rent (The Pratt Center, Vol. I, 2001, p 15; Seattle, July 2007, p. 12). Manufacturers may find such increases cost prohibitive, forcing them to relocate or not even consider an area for operations.

Road circulation in and around industrial areas has a critical impact on the ability to do business in the areas. The industrial land use report prepared for Minneapolis, for example, included the following statement: "Access to industrial properties from the roadway network is perhaps the most important factor in locating and preserving industrial users" (Maxfield, 2006, p. 95). Circulation also impacts parcel size and configuration because trucks need a certain amount of space for staging and maneuvering (D.C., 2006, p. 46).

The movement of freight, whether by truck, rail, or plane, was found to be a strength and a weakness for attracting manufacturers to Atlanta. Rail is still considered an affordable and effective means of moving goods in Atlanta (Atlanta Regional Commission, 2008, p. 13). The historical investments in rail corridors and inter-modal facilities will continue to benefit Atlanta's industrial users, and access to rail should be important in future evaluations. However, road access, specifically commercial trucking routes will dictate the vitality of any industrial area in Atlanta. The need for designating and updating truck routes to aid in commercial road shipping has been suggested in Atlanta's comprehensive transportation plan (Atlanta, April 2008, p. 5). Additionally, the Atlanta Regional Commission (ARC) is currently undertaking a regional truck route master plan as recommended from the "2008 Atlanta Regional Freight Mobility Plan."[3] Individual NPU boards have specified problem intersections that impact industrial users.[4] Redevelopment plans and tax allocation district (TAD) reports prepared by the Atlanta Development Authority's for areas such as Metropolitan Parkway specifically made points about congestion in commercial truck corridors, as well.[5]

[3] Additional information about ARC's planning efforts for strategic commercial truck routes can be found at http://www.atlantaregional.com/html/4979.aspx.

[4] Various plans and studies at the neighborhood level that include specific reference to problem intersections can be found at the City of Atlanta's Bureau of Planning's website at http://www.atlantaga.gov/government/planning/plans_studies.aspx.

[5] Reports of the ten (10) TADs can be found at the Atlanta Development Authority's website at http://www.atlantada.com/buildDev/taxAllocationDistricts.jsp.

In addition to access transportation infrastructure, utilities such as gas, electric, water, sewer, and telecommunications should be a factor in evaluating areas. All the case cities noted the advantages of infill development in terms of access to pre-existing infrastructure. For example, Atlanta's comprehensive plan encouraged the redevelopment of underused industrial areas serviced by existing utilities. However, utilities could also be old or obsolete in historically industrial areas. Los Angeles and Seattle recognized this unfortunate reality in analyzing functionality in their industrial areas (LA, Attachment B, 2007, pp. 30-31; Seattle, July 2007, p. 13). Minneapolis specifically addressed the competitive advantage that newer suburban industrial parks have in attracting users that need fiber optics and other high technology infrastructure (Maxfield, 2006, p. 95).

The location-specific benefits mentioned above are considered important to how well an industrial area functions. These location attributes are also intrinsically linked to an industrial area's form because both form and function are spatially-fixed. Subsequently, planning for industrial areas also needs to account for the real estate market realities.

Marketability

Industrial land use studies take into account certain building and land conditions that have direct impact on usefulness/obsolescence, costs, and availability of the real estate assets in industrial areas. Market analyses more akin to products from professional real estate brokers were commonly undertaken as a component of the case cities' planning efforts. Supplemental information on buildings and land was often presented as indicators with corresponding measurements that were more descriptive in nature and often produced by planning staff conducting area-specific surveys. The following Table is a summary of common indicators that may assist Atlanta's own planning activities.

Table 5.4b: Common Indicators Used in Evaluating the Marketability of Industrial Buildings

Indicators	Measurements and Descriptors
Type	Flex, heavy manufacturing, light industrial, warehousing are common names for the variety of building typologies
Size	Area size per use (e.g., office, showroom, manufacturing, etc.); opened or partitioned floor areas
Age	Age is a proxy for obsolescence and construction (e.g., multi-story versus single-story)
Amenities	High ceilings; modern loading bays
Truck areas and parking	Truck parking, turnaround, and staging; employee parking
Floor area ratio (FAR)	FAR is a density measurements used in estimating future land needs, costs, and economic impact

Highlighting the strengths and weaknesses of existing building stock provides information about impediments to industrial land development. Modern manufacturers have different space needs than their predecessors. Having a realistic generalization of building design and layout will help tailor responses such as rehabilitation, demolition, and targeting the right users for the available space. Size is obviously an important characteristic in evaluating a building. However, more information about certain aspects of a building's size is necessary. For instance, planners at Washington, D.C. surveyed industrial businesses to assess their needs and found that today's manufacturers in the District have a variety of office, warehousing, manufacturing, and other space needs (D.C., 2006, pp. 169-170). A building's age, which can often be found from local property assessor records, is a common indicator of obsolescence as well as construction. Manufacturers consider amenities such as high ceilings (at least 30'), loading bays, truck access, and parking as very important to their operations (D.C., 2006, p. 46; Minneapolis, 2006, p. 109; Seattle, May 2007, pp. 48-49).

Floor area ratio (FAR) is a simple but effective indicator of density. It can help explain an area's carrying capacity for more or less buildings; it can be used in developing estimates of potential property values based on new construction costs; and it can influence an area's urban design. A common practice in

estimating future space needs and matching it with land supply is to use a standard FAR. Minneapolis evaluated its industrial areas and found that the average FAR was .70 (Maxfield, 2006, p. 83); Los Angeles used an estimate of .50 in their estimates (LA, 2004, p. 77); and the District of Columbia used a ratio of .75 (D.C., 2006, p. 44). Philadelphia also used FAR information to contrast urban with suburban industrial density and found suburban to be considerably less dense as indicated by ratios measuring .24 for flex space, .27 for heavy industry, and .29 for warehousing (PIDC, 2009).

Table 5.5b provides a list of indicators that were commonly referred to in gauging the availability of land and buildings as well as the time and costs necessary to occupy space. Cities use ownership information to develop insights into future policies that discourage speculation and encourage the reuse of underutilized or surplus publically-owned land. These efforts in assessing marketability have been motivators for action in the case studies. Seattle's evaluation of ownership, for example, discovered that 47% of the industrially-zoned land in the city was owned by the public (Seattle, May 2007, p. 15). Delinquent taxes and liens (e.g., mortgage, mechanical, and regulatory liens) were also indicators of possible acquisition, assembly, and targeting initiatives. Information on property encumbrances (e.g., liens and covenants) can be found in local assessor's records, but further evaluation to fill gaps and verify public record searches may require more specialized approaches such as title examinations. An area's marketability may also be negatively impacted by the local permitting process. Surveys of industrial businesses that have recently been through the permitting process may identify frustration, costs increases, and time delays related to the process. A review of issued and denied building permits for manufacturers may also be helpful in evaluating changes to the local permitting process to improve an area's marketability. Existing building code violations also provide insight into an area's marketability. As stated in the Atlanta Strategic Action Plan, "Some neighborhoods have a higher number of [c]ode

Table 5.5b: Common Indicators of Building and Land Availability, and Pre-Development Costs and Time Affecting Marketability

Indicators	Measurements and Descriptors
For Sale	Cost per acre; building cost
For Lease	Cost per square foot of building space; land lease opportunities; temporary lease terms
Vacant	Possible assembly opportunities for increasing parcel sizes; and accommodating expansion of existing operations or areas
Land use restrictions	Prevent certain uses; influence compatibility issues among users
Demolition and brownfield issues	Unknown or known pre-development costs; introduces element of risk and time
Owners	Types; names; quantity
Public ownership	Jurisdiction; local department; surplus; underutilization of non-taxable land
Taxes and liens	Possible acquisition through foreclosures; revenue sources for redevelopment initiatives; targeted efforts in releasing or otherwise retiring liens to allow future redevelopment
Permits	Permitting process may be inefficient causing frustration, excess costs, and time delays for businesses; help focus efforts in streamlining the permitting process
Building code violations	Identification of problem areas and owners; demolition prospects; and targeted area-wide enforcement needs

[e]nforcement violations. These violations add to the overall poor appearance in some neighborhoods and may promote crime" (April 2008, p. 94). In the studio's site visits, for example, improper screening was observed in some areas contributing to negative perceptions of the areas. Building code issues were also a concern for other cities. Chicago's code has prescribed screening requirements and other guidelines to ensure aesthetics are maintained in industrial districts (Chicago, 2009, Chapter 17-5).

Public Priority

The fourth factor to be considered in evaluating industrial areas is public priorities. A consistent issue from the case studies was the priority to address vacant and underutilized property for industrial purposes. Cities used evaluations to characterize areas of underutilization and identify the location of significant vacant land in and adjacent to targeted industrial areas. In preparing comprehensive and neighborhood-level plans, cities incorporated these evaluations to select priority areas for industrial development. Plans for Atlanta included several types of priority areas such as specific sites, nodes, corridors, and business parks.[6]

As the previous sections indicated, several factors impact the vitality of industrial areas. Freight logistics and transportation were important considerations in evaluating areas. All of the cities included in the review highlighted their logistic strengths and included various indicators such as proximity to airports, seaports, inter-modal centers, and highways in their industrial area evaluations.

Capital improvement plans and budgets were also commonly integrated into the case study cities' industrial area evaluations. Chicago's coordination of public infrastructure investment in its planned manufacturing districts was considered a best management practice in many of the reviewed reports (D.C., 2006, p. 83; The Pratt Center, Vol. I, 2009, p. 68; Minneapolis, 2006, p. 115). Atlanta's five-year capital budget can be used as a resource in evaluating public priority at specific areas. Further, the needs of Atlanta's service departments should be considered in evaluating areas.

All of the case study cities also incorporated their financial and technical services into in evaluating industrial areas. The Philadelphia Industrial Development Corporation, for instance, is using the industrial land planning process as an opportunity to prioritize future land assembly and other services to facilitate reuse in targeted areas (Dalfo, 2009). Chicago uses tax increment financing in its planned manufacturing districts to encourage redevelopment. Recommendations such as targeting brownfield assistance to assess and remediate sites in industrial areas were included in industrial land use plans (D.C., 2006, p. 104).

Table 5.6b summarizes important public priorities relating to the evaluation of industrial areas in Atlanta. Area evaluations should incorporate as many details and as much information from the numerous plans and studies that have direct and indirect impacts on the industrial areas. The objective

in performing evaluations is to identify and help overcome barriers to industrial use in areas that are a priority for Atlanta.

[6] Various plans and studies at the neighborhood level can be found at the City of Atlanta Bureau of Planning's website at http://www.atlantaga.gov/government/planning/plans_studies.aspx.

Table 5.6b: Public Priorities Relating to Evaluating Atlanta's Industrial Areas

Public Priority	Description	Lead Agency	Source of Information
1. Atlanta Regional Freight Mobility Plan	Study that identifies the Atlanta region's strengths and weaknesses for commercial transportation of goods	Atlanta Regional Commission (ARC)	http://www.atlantaregional.com/arc/html/
2. Atlanta Strategic Action Plan	Implementation plan of the comprehensive plan (includes information about various programs-Urban Enterprise Zones, Improvement Districts, Atlanta/Fulton Land Bank, etc.)	City of Atlanta	http://www.atlantaga.gov/government/planning/asap.aspx
3. Beltline Project	Project that is focused on the redevelopment of properties along 22 miles of a multi-purpose transit network	Atlanta BeltLine, Inc.	http://www.beltline.org/
4. Brownfield Redevelopment Project	Initiative to assist in identifying, assessing and remediating brownfield sites	City of Atlanta	http://www.atlantaga.gov/government/planning/brownfields.aspx
5. Capital Improvement Program	Five-year projection of capital needs for public facilities and infrastructure improvements	City of Atlanta	http://www.atlantaga.gov/government/planning/cip.aspx
6. Comprehensive Development Plan	A guide for physical, social, and economic growth and development over the next 25 years	City of Atlanta	http://www.atlantaga.gov/government/planning/cdp.aspx

Table 5.6b: Public Priorities Relating to Evaluating Atlanta's Industrial Areas (cont.)

Public Priority	Description	Lead Agency	Source of Information
7. Connect Atlanta	A comprehensive regional transportation plan that focuses on Atlanta's existing transportation infrastructure	City of Atlanta	http://www.connectatlantaplan.com
8. Connect Atlanta	A comprehensive regional transportation plan that focuses on Atlanta's existing transportation infrastructure	City of Atlanta	http://www.connectatlantaplan.com
9. Economic Development Plan	Identified 14 economic development focus areas	Atlanta Development Authority (ADA)	http://www.atlantada.com/econoDev/measuringSuccess.jsp
10. Livable Centers Initiative Areas	Program that provides planning grants to communities for mobility studies in employment areas	ARC	http://www.atlantaga.gov/government/planning/lciprogram.aspx
11. NPU and Redevelopment Plans	Various studies on land use, transportation, and neighborhood revitalization	City of Atlanta NPUs ADA	http://www.atlantaga.gov/government/planning/plans_studies.aspx
12. Sustainable Atlanta	A program focused on connecting the various initiatives impacting the environment, equity, and Atlanta's economy	Sustainable Atlanta City of Atlanta	http://www.sustainableatlanta.org/
13. Tax Allocation Districts (TADs)	10 legally defined geographical areas that provide redevelopment funding	ADA	http://www.atlantaga.gov/government/planning/tad.aspx

Industrial Area Evaluation

The studio's preliminary field observations from September were summarized and can be found in the Appendix to this report. Future evaluations of selected industrial areas are recommended to demonstrate the benefit and appropriateness of assessing important characteristics specific to industrial areas in Atlanta. Characteristics attributing to an area's form, function, marketability, and public priority will be taken into account in the evaluation. A draft of the evaluation matrix can also be found in the Appendix.

Based on the evaluations, patterns of existing conditions may emerge. In anticipation of critically analyzing these patterns and providing appropriate recommendations for policy responses, the studio class will develop and utilize a descriptive classification scheme with categories of policy response. This evaluation activity was undertaken in some manner by most of the case cities to provide qualitative information. The District of Columbia developed an excellent evaluation framework and is a good example for the studio (D.C., 2006, pp. 16, 76-80, 161-163). The table below is an adaptation of the Washington, D.C. model for the studio.

Table 5.7b: Organizational Scheme to Evaluate Atlanta's Industrial Areas

Preliminary Identification of Priority Areas	Organization of Criteria	Evaluation of Observation and Patterns	Classification of Areas	Categories of Policy Response
1. Southside Industrial Park 2. Atlanta Industrial Park 3. Atlanta Technology Enterprise Park 4. Ridge Avenue 5. Metropolitan Parkway Corridor 6. Former GA State Farmers Market 7. Honor Farm 8. Cleveland Avenue 9. Moreland Ave. Corridor	Form Function Marketability Public Priority	Evaluation Tool Scoring Matrix Findings and Patterns	Healthy Fabric Expand Pressure Underutilization Friction	Retention and Reinforcement Intensification/Evolution Strategic for Public Use Land Use Change

Sites 1-5 in Table 5.7b were recommended at the October 8, 2009 presentation as areas for further evaluation during the second half of the studio. The selection provides a good cross-section of Atlanta's industrial areas that could fall under any of the classifications of area. At this time, there has not been a final determination of which two or three areas will be chosen as projects for the studio. The portion from the October 8, 2009 presentation relevant to this section is in the Appendix and it provides highlights of the areas.

A discussion of studio's complete process of evaluating the selected industrial areas in Atlanta based on the conceptual framework will be provided in the final report.

Conclusion

Evaluating industrial areas was found to be a critical component to any industrial study. In fact, a regular review of industrial districts in Los Angeles is mandated by the City's comprehensive plan; evaluations are that important (LA, Attachment B, 2007, p. 29).

This section provided an introduction to defining the existing conditions of industrial land and buildings during industrial land use planning at the local level. A review of industrial land use policies from eight (8) cities across the nation and reports addressing Atlanta's industrial land were reviewed. Key issues common to the case cities were identified and organized in a manner to guide the future analysis of industrial areas in Atlanta. A recommended perspective to understanding Atlanta's industrial areas includes four (4) important criteria: 1) form, 2) function, 3) marketability, and 4) public priority. The intent is to inform the decision-making process by establishing a framework for identifying and protecting the most valuable industrial land.

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Design Considerations

Aesthetic qualities have risen to considerable significance in commercial and industrial development in recent decades. This is due in part to both the rising demand by businesses for stable, planned environments in which to conduct operations, and, more importantly, to the drive to ensure that industrial land users are good neighbors to the surrounding community.

With a history of environmental degradation and nuisance, industrial land uses have long been devalued and ostracized. However, pressing new economic and environmental imperatives demand that we protect existing industry and expand to accommodate new, thus, retaining well-paying industrial jobs and diversifying the local economy.

Principal Development Types

Industrial development has been dominated by two principal organizational types: the park and the district.[14] The industrial district is distinguished by its situation within a greater urban context, commonly within highly urbanized central cities. These "large concentrations of freestanding factories, warehouses and supply yards are frequently found intermixed with commercial and service establishments."[15] They are vestiges of America's bygone industrial age, suffering silently of neglect and structural obsolescence. Their efficient operation is severely hampered by insufficient road and utility capacity. Additionally, the district's proximity to non-industrial activity subjects its industrial users to both competition among others for valuable real estate and potentially costly nuisance abatement measures. Aesthetic and design matters in industrial districts are typically subject only to the provisions of the local zoning code.[16]

The park, contrasted with the largely organic structure of the district, was designed (planned) for the use of commercial enterprise and manufacturers.[17] The park's contiguous boundaries, closed to competing uses, provides security for its occupants. It is commonly situated amidst its own infrastructure and roadways, reducing demand on networks designated primarily for non-commercial use. Most importantly, however, parks are shielded, in many regards, from encroachment by non-

[14] Conway, H. M., Liston, L. L., & Saul, R. J. (1979). *Industrial Park Growth: An Environmental Success Story (Industrial Development Site Selection Handbook)*. Atlanta, GA: Conway Publications.
[15] Lochmoeller, D. C. (1977). *Industrial Development Handbook*. Washington, D.C.: Urban Land Institute.
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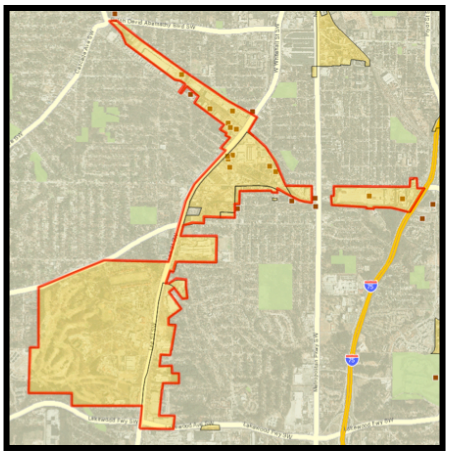
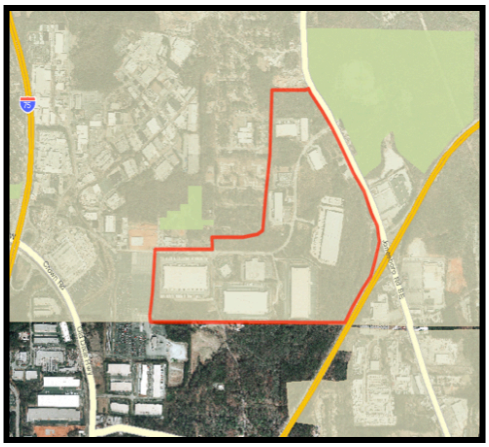
industrial land users and from nuisance abatement pressures. As an added measure, use covenants, deeded early in the park's development, govern design, performance, landscaping and many other standards.[18] For this reason, the park environment is generally regarded as better maintained and more desirable than its unplanned counterpart.



Industrial District



Industrial Park

In Atlanta, as in other cities, the stigma of industrial nuisance was one factor that led to the suburban seclusion of industry. It follows logically, then, that contemporary developers would adopt the long-standing suburban mode. Though the park format does offer an envelope of protection to industrial land users, the district concept is arguably the more sustainable of the two forms.

Suburban-style superblock developments framed by curvilinear driveways and cul-de-sacs have proven unsustainable. Aside from the undesirability of oddly-shaped lots, often, when their initial users vacate, these properties remain vacant and must be entirely redeveloped due to the difficulty inherent in adapting them for reuse. Development based on gridded street networks with reasonably sized blocks is more flexible, and holds greater potential for long-term viability. Unfortunately, many of the central city locations that once provided this more stable framework to industrial businesses have been re-zoned to "higher" uses. A successful industrial land use strategy must address both nuisance abatement (actual and perceived) and loss of industrial-zoned land.

[18] Lochmoeller, D. C. (1977). *Industrial Development Handbook*. Washington, D.C.: Urban Land Institute.

Sources of Structure

In an assessment of several case study cities, the structure and appearance of industrial areas was found to be shaped by a number of influences. Among these were legal controls, like zoning codes, use covenants, and ordinances. Also highly influential were various policy levers, like design guidelines. Together, these mechanisms function to effectively manage and protect local industry.

Zoning

Euclidian zoning, emphasizing strict segregation of land uses deemed incompatible, continues to dominate the zoning practices of most American municipalities.[19] This may have been appropriate at a time when industry's presence truly did have a negative impact on property values and quality of living in a given area. But, while technological innovation has reduced or eliminated at least some of the nuisances for which industry was once unwelcome, most municipal zoning codes have not been reformulated to adequately accommodate manufacturing and commercial uses near residential development. Many manufacturing processes are now less noxious and may be safely co-located with common service and retail establishments.[20] Some communities have recognized this, responding by reconceptualizing their zoning techniques, opting for nuanced, intensity-based assessments, successfully reintegrating these well-paying job sources into the urban context.

A concept present in several case study cities is the contribution of flexible zoning to the development of buffer zones for shielding heavier, more noxious, but nonetheless essential industrial operations from the rest of the community. Flexibility in zoning permits the co-location of compatible low-impact manufacturing and production firms with service and retail firms surrounding pockets of moderate and heavy industrial activity. Additionally, higher density residential development is commonly permitted within 'buffer' zones to accommodate workforce and affordable housing needs.

The following tables facilitate comparison of the zoning codes of four case study cities by illustrating allowable uses in common terms. The zones displayed are industrial and commercial in nature, increasing in intensity of uses permitted from left to right. Lower intensity commercial zones are shown on the left and heavy industrial zones on the right. Uses are indicated as follows: permitted by right (P),

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[19] *Types of Zoning Codes | Zoning Matters*. (n.d.). Retrieved October 14, 2009, from http://www.zoningmatters.org/facts/trends

[20] Frej, A., & Gause, J. A. (2001). *Business Park and Industrial Development Handbook (ULI Development Handbook Series)*. Washington, D.C.: Urban Land Institute.

conditional use (CU), limited use (L), not permitted (N). The asterisk (*) indicates that a special condition is attached to the siting of a use in that particular zone. Conditional use designation signifies that administrative or council approval is required before siting of the use is approved. Limitations on uses might include restrictions on floor area of establishments or may mean only certain types of an activity are permissible.

Portland

Portland	Zones													
Use Categories	CN1	CN2	CO1	CO2	CM	CS	CG	CX	EG1	EG2	EX	IG1	IG2	IH
Residential Categories														
Single-Family Residential	P	P	P	P	P	P	P	P	CU	CU	P	CU*	CU*	CU*
Multi-family Residential	P	P	P	P	P	P	P	P	CU	CU	P	CU*	CU*	CU*
Group Living	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	CU	CU	L/CU*	N	N	N
Commercial Categories														
Retail Sales and Service	L*	P	N	L*	L*	P	P	P	L/CU*	L/CU*	P	L/CU*	L/CU*	L/CU*
Office	L*	P	P	P	L*	P	P	P	L*	L*	P	L/CU*	L/CU*	L/CU*
Quick Vehicle Servicing	N	L*	N	N	N	N	P	L*	P	P	N	P	P	P
Vehicle Repair	N	N	N	N	N	P	P	L*	P	P	P	P	P	P
Commercial Parking	N	N	N	N	N	P	CU*	CU*	CU*	CU*	CU*	CU*	CU*	CU*
Self Service Storage	N	N	N	N	N	N	L*	L*	P	P	L*	P	P	P
Comm Outdoor Recreation	N	N	N	N	P	P	P	P	P	P	P	CU	CU	CU
Major Event Entertainment	N	N	N	N	N	CU	CU	P	CU	CU	CU	CU	CU	CU
Industrial Categories														
Agriculture	N	N	N	N	N	CU	CU	CU	P	P	P	P	P	P
Manufacturing and Production	L*	L*	N	N	L*	L*	L*	L*	P	P	P	P	P	P
Warehouse and Freight Movement	N	N	N	N	N	N	CU*	N	P	P	P	P	P	P
Wholesale Sales	N	N	N	N	L*	L*	L*	L*	P	P	P	P	P	P
Industrial Service	N	N	N	N	N	CU*	CU*	CU*	P	P	P	P	P	P
Railroad Yards	N	N	N	N	N	N	N	N	N	N	N	P	P	P
Rail Lines and Utility Corridors	CU	CU	CU	CU	CU	CU	CU	CU	P	P	P	P	P	P
Waste Related	N	N	N	N	N	N	N	N	N	N	N	L/CU*	L/CU*	L/CU*
Mining	N	N	N	N	N	N	N	N	N	N	N	CU	CU	CU
Radio Transmission Facilities	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	CU	L/CU*	L/CU*	L/CU*
Air and Surface Passenger Terminals	N	N	N	N	N	N	CU	CU	CU	CU	CU	CU	CU	CU
Institutional Categories														
Basic Utilities	P/CU*	P/CU*	P/CU*	P/CU*	P/CU*	P/CU*	P/CU*	P/CU*	P/CU*	P/CU*	P/CU*	P/CU*	P/CU*	P/CU*
Community Service	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	L/CU*	L*	L*	L*	L/CU*	L/CU*	L/CU*
Parks and Open Areas	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Daycare	P	P	P	P	P	P	P	P	P	P	P	L/CU*	L/CU*	L/CU*
Schools	P	P	P	P	P	P	P	P	P	P	P	N	N	N
Colleges	P	P	P	P	P	P	P	P	P	P	P	N	N	N
Medical Centers	P	P	P	P	P	P	P	P	P	P	P	N	N	N
Religious Institutions	P	P	P	P	P	P	P	P	P	P	P	N	N	N
Detention Facilities	N	N	N	N	N	N	CU	CU	CU	CU	CU	CU	CU	CU

Use Zones

CN1 – Neighborhood Commercial 1

CN2 – Neighborhood Commercial 2

CO1 – Office Commercial 1

CO2 – Office Commercial 2

CM – Mixed Commercial/Residential

CS – Storefront Commercial

CG – General Commercial

CX – Central Commercial

EG1 – General Employment 1

EG2 – General Employment 2

EX – Central Employment

IG1 – General Industrial 1

IG2 – General Industrial 2

IH – Heavy Industrial

Status of Use

P – Permitted by Right

L – Limited Use

CU – Conditional

N – Not Permitted

* – Special Condition

Chicago

Chicago	Zones								
Use Categories	B1	B2	B3	C1	C2	C3	M1	M2	M3
Residential Categories									
Single-Family Residential	CU	P	CU	CU	CU	N	N	N	N
Multi-family Residential	CU	P	CU	CU	CU	N	N	N	N
Group Living	CU	P	CU	CU	CU	L/CU	L/CU	L/CU	N
Commercial Categories									
Retail Sales and Service	L/CU	L/CU	CU	CU	CU	CU	CU	CU	CU
Office	P	P	P	P	P	P	L/P	P	L/P
Quick Vehicle Servicing	N	N	P	P	P	P	P	P	P
Vehicle Repair	N	N	N	P	P	P	P	P	P
Commercial Parking	P	P	P	P	P	P	CU	CU	CU
Self Service Storage	N	N	P	P	P	P	N	N	N
Comm Outdoor Recreation	N	N	P	N	P	P	N	N	N
Major Event Entertainment	L/CU	L/CU	PD	PD	PD	PD	CU	CU	CU
Industrial Categories									
Agriculture	N	N	L/CU	L/CU	L/CU	L/CU	N	P	P
Manufacturing and Production	N	N	L/CU	P	P	P	P	P	P
Warehouse and Freight Movement	N	N	N	P	P	P	P	P	P
Wholesale Sales	N	N	N	P	P	P	P	P	P
Industrial Service	N	N	N	P	P	P	P	P	P
Railroad Yards	N	N	N	N	N	N			
Rail Lines and Utility Corridors	CU	CU	CU	CU	CU	CU	CU	CU	CU
Waste Related	N	N	L/CU	L/CU	L/CU	L/CU	N	N	CU
Radio Transmission Facilities	CU	CU	CU	CU	CU	CU	P	P	P
Institutional Categories									
Basic Utilities	P	P	P	P	P	P	CU	CU	CU
Community Service	P	P	P	P	P	P	P	P	P
Parks and Open Areas	P	P	P	P	P	P	P	P	P
Daycare	P	P	P	P	P	P	P	P	N
Schools	CU	CU	CU	CU	CU	CU	N	N	N
Colleges	P	P	P	P	P	CU	L/P	N	N
Medical Centers	N	N	N	P	P	P	N	N	N
Religious Institutions	CU	CU	CU	CU	CU	CU	N	N	N
Detention Facilities	N	N	N	CU	CU	CU	CU	CU	CU

Use Zones

B1 – Neighborhood Shopping District

B2 – Neighborhood Mixed-Use District

B3 – Community Shopping District

C1 – Neighborhood Commercial District

C2 – Motor Vehicle-Related Commercial District

C3 – Commercial, Manufacturing and Employment District

M1 – Limited Manufacturing/Business Park District

M2 – Light Industry District

M3 – Heavy Industry District

Status of Use

P – Permitted by Right

L – Limited Use

CU – Conditional

N – Not Permitted

Los Angeles

Los Angeles	Zones							
Use Categories	C2	C4	CM	MR1	M1	MR2	M2	M3
Residential Categories								
Single-Family Residential	P	P	N	N	N	N	N	N
Multi-family Residential	P	P	N	N	N	N	N	N
Group Living	P	P	N	L/P	N	N	N	N
Commercial Categories								
Retail Sales and Service	L/P	P	L/P	L/P	L/P	L/P	L/P	L/P
Office	P	P	CU	L/P	L/P	L/P	L/P	L/P
Quick Vehicle Servicing	P	P	N	N	N	N	N	N
Vehicle Repair	L/P	P	N	N	N	N	N	N
Commercial Parking	P	P	N	N	N	N	N	N
Self Service Storage	N	P	N	N	P	P	P	P
Comm Outdoor Recreation	P	P	N	N	N	N	N	N
Major Event Entertainment	L/P	N	N	N	P	N	P	P
Industrial Categories								
Agriculture	N	N	N	P	P	P	P	P
Manufacturing and Production	L/P	L/P	P	P	P	P	P	P
Warehouse and Freight Movement	N	N	P	P	P	P	P	P
Wholesale Sales	N	N	P	P	P	P	P	P
Industrial Service	N	N	P	P	P	P	P	P
Railroad Yards	N	N	N	P	P	P	P	P
Rail Lines and Utility Corridors	N	N	N	P	P	P	P	P
Waste Related	N	N	N	N	N	N	L/P	P
Radio Transmission Facilities	N	N	N	N	P	P	P	P
Air and Surface Passenger Terminals	L/P	L/P	N	N	N	N	N	N
Institutional Categories								
Basic Utilities	N	N	N	P	P	P	P	P
Community Service	L/P	P	N	N	N	N	N	N
Parks and Open Areas	P	P	P	P	P	P	P	P
Daycare	P	P	N	N	N	N	N	N
Schools	P	P	N	N	N	N	N	N
Colleges	P	P	N	N	N	N	N	N
Medical Centers	P	P	L/CU	L/P	L/P	L/P	L/P	N
Religious Institutions	P	P	N	N	N	N	N	N
Detention Facilities	N	N	N	N	N	N	N	N

Use Zones

C2 – Commercial Zone 2

C4 – Commercial Zone 4

CM – Commercial Manufacturing Zone

MR1 – Restricted Light Industrial Zone 1

M3 – Heavy Industrial Zone

M1 – Limited Industrial Zone 1

MR2 – Restricted Light Industrial Zone 2

M2 – Limited Industrial Zone 2

Status of Use

P – Permitted by Right

L – Limited Use

CU – Conditional

N – Not Permitted

Seattle

Seattle	Zones									
Use Categories	SM	NC1	NC2	NC3	C1	C2	IB	IC	IG1	IG2
Residential Categories										
Single-Family Residential	P	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU
Multi-family Residential	P	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU
Group Living	P	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU
Commercial Categories										
Retail Sales and Service	L/P	L/P	L/P	P	P	P	P	P	P	P
Office	P	L/P	L/P	P	L/P	L/P	P	P	P	P
Quick Vehicle Servicing	N	L/CU	L/CU	L/CU	P	P	P	P	P	P
Vehicle Repair	N	N	L/CU	P	P	P	CU	CU	CU	CU
Commercial Parking	N	N	L/CU	P	P	P	P	P	CU	CU
Self Service Storage	CU	N	N	L/CU	L/CU	P	P	P	P	P
Comm Outdoor Recreation	P	N	N	N	P	P	P	P	P	P
Major Event Entertainment	P	N	L/P	P	P	P	P	P	P	P
Industrial Categories										
Agriculture	L/CU	L/CU	L/CU	CU	P	P	L/P	L/P	L/P	L/P
Manufacturing and Production	L/P	L/CU	L/CU	L/CU	L/CU	L/CU	CU	CU	CU	CU
Warehouse and Freight Movement	N	N	N	L/CU	L/CU	L/CU	CU	CU	CU	CU
Wholesale Sales	N	N	L/CU	L/CU	L/CU	L/CU	P	P	P	P
Industrial Service	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	CU	CU	CU	CU
Railroad Yards	N	N	N	N	N	N	CU	CU	CU	CU
Rail Lines and Utility Corridors	P	P	P	P	P	P	CU	CU	CU	CU
Waste Related	N	N	N	N	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU
Air and Surface Passenger Terminals	P	N	N	L/CU	P	P	P	P	P	P
Institutional Categories										
Basic Utilities	L/P	L/P	L/P	L/P	L/P	L/P	CU	CU	CU	CU
Community Service	P	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU
Parks and Open Areas	P	P	P	P	P	P	P	P	P	P
Daycare	P	L/P	L/P	P	P	P	P	P	P	P
Schools	CU	P	P	P	P	P	P	P	P	P
Colleges	CU	L/CU	L/CU	P	P	P	L/CU	L/CU	L/CU	L/CU
Medical Centers	CU	L/CU	L/CU	P	P	P	L/CU	L/CU	L/CU	L/CU
Religious Institutions	CU	P	P	P	P	P	P	P	P	P
Detention Facilities	N	N	N	N	N	N	N	N	N	N

Use Zones

SM – Seattle Mixed

NC1 – Neighborhood Commercial 1

NC2 – Neighborhood Commercial 2

NC3 – Neighborhood Commercial 3

C1 – Commercial

C2 – Commercial 2

IB – Industrial Buffer

IC – Industrial Commercial

IG1 – General Industrial 1

IG2 – General Industrial 2

Status of Use

P – Permitted by Right

L – Limited Use

CU – Conditional

N – Not Permitted

Thoughtful mixing of land uses is a difficult undertaking, often with unpredictable outcomes. As is observed through the case studies, though, principal and accessory use designation offers much needed structure to a mixed-use zoning scheme. In the particular case of commercial and industrial zones, the objective is the creation of progressively intensifying commercial zones which buffer, and eventually give way, to robust zones of manufacturing and other high-impact industrial activities.

The primary or *principal use* designation of a zone determines the nature of the activities that will be permitted by right. Secondary or *accessory uses* should be included to promote the efficient operation of the zone's primary use and to enhance its social environment. Additionally, the prevalence of *conditional use* designations suggests these cities embrace a proactive and detail-oriented permitting process. The conditional use review process offers planning officials an opportunity to evaluate the impact of and need for a particular proposed use before it is sited. This added level of scrutiny can help to ensure that available land is not over allocated to non-industrial uses, and that a proper balance of industrial uses is maintained.

The most striking of the case studies is Los Angeles, in which there is minimal effort to mix uses. Commercial zones allow little, if any, industrial activity. Likewise, industrial zones minimize retail, service and other non-industrial uses. Los Angeles' separation of uses stands in stark contrast to the attempt at balance reflected in the zoning codes of cities like Portland and Seattle.

Policy Approaches

While a flexible zoning framework is important, it is only one aspect of the more comprehensive strategies employed to protect industrial lands in several case study cities. Because zoning is always subject to change, a stronger control mechanism is often needed to promote longevity and stabilize industrial land holdings. Different cities have taken different approaches to reverse the trend of industrial land conversion and to support the aesthetic improvement of their industrial areas. Chicago, Portland, San Francisco and New York's Industrial Retention Network offer promising policy innovations.

Chicago

The City of Chicago offers a wide range of policy tools for industrial land control. Beginning in the 1990s, the city established *Planned Manufacturing Districts* to protect its declining industrial base, and to

promote a stable environment for industrial investment and expansion. Planned Manufacturing districts are implemented as zones, though unlike other zones, they require a vote by the City Council to be altered. All PMDs have firm boundaries and a minimum required area of five contiguous acres. Accessory uses are allowed only by permit. Additionally, nonconforming uses may be replaced only by uses allowed by right.

The rights to impose development standards within PMDs that go beyond those required by the zoning ordinance have been devolved to hosting communities. However, even where a community imposes no further obligations, the City has implemented a landscaping ordinance, and the Department of Transportation, a program for streetscape improvements.

Chicago's *Landscape Ordinance* requires that owners and developers of commercial and industrial properties provide landscaping with new developments or when improvements are undertaken. The ordinance stipulates that three types of landscaping must be furnished: parkway tree planters, screening for vehicular use areas, and internal parking for vehicular use areas. Property owners must submit an illustrated landscaping plan detailing how the requirements of the ordinance will be met. The Bureau of Forestry and the Department of Planning are charged with ensuring compliance, and may prevent issuance of certificates of occupancy for developments failing to meet the requirements.
The Chicago Department of Transportation has also made efforts to affect the aesthetic quality of Chicago's streets through the development of its *Streetscapes Program*. CDOT's program guide offers brief explanations on the psychology of the streetscape, necessary components, and ideas for creating streets that are both pedestrian-friendly and functional for all modes of transit.

Particularly interesting within the guide is its chapter on the creation of community identifiers. "Community Identifiers," it says, "are sculptural elements within a streetscape that seek to bring a unique identity to a neighborhood commercial area." The concept for these elements may be drawn from the area's history, architectural legacy, or cultural background. Once identified, the symbolic element may be used in a variety of forms, including pavement medallions, 'gateway' structures, fabric or permanent pole fixtures, and kiosks. The Chicago Stockyards PMD is one industrial district that has seized upon CDOTs program as an opportunity to create memorable neighborhood identifiers that evoke its unique industrial heritage.

Source: http://www.flickr.com/photos/mss2400/2341213225/

Source: http://www.flickr.com/photos/chrissy575/3461329106/

Portland - *Industrial Sanctuaries*[21]

Similar to Chicago's Planned Manufacturing Districts, the City of Portland moved to adopt *Industrial Sanctuaries* in its current comprehensive plan. Sanctuaries are intended to protect Portland's industrial land users and the valuable jobs they provide. Although residential and other uses are permitted, they are understood to occupy only an accessory use status.

San Francisco - *Industrial Protection Zones*[22] *Residential/ Industrial Compatibility and Protection Ordinance*[23]

Recognizing that its existing industrial lands were increasingly under pressure from non-industrial encroachment, San Francisco's Planning Commission sought to protect the lands that remained with the year 2000 passage of an ordinance providing for targeted *Industrial Protection Zones* and *Housing Zones*. The ordinance discouraged the conversion of industrial land to office and retail space in its "Production-Distribution-Repair" (PDR) buffer zones, and encouraged the development of affordable mixed-use housing.

The *Residential and Industrial Protection and Compatibility Ordinance* protects existing industrial businesses from potentially harmful non-industrial development on adjacent lands. The ordinance stipulates that no industrial use can be deemed a public or private nuisance after it has been in operation for two years, if it was not a nuisance at the time of its establishment. The ordinance requires that potential residents be notified of the possible consequences of living in proximity to an industrially zoned district.

New York Industrial Retention Network – *Industrial Land Conversion Fees*[24]

Finally, the New York Industrial Retention Network advocates the use of conversion fees. In instances where land use designation change cannot be prevented, NYIRN suggests that municipalities use conversion fees, a type of impact fee, to recoup a portion of loss incurred when industrial land is

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[21] *Guild's lake Industrial Sanctuary Plan District*. (n.d.). Retrieved October 14, 2009, from www.portlandonline.com/bps/index.cfm?c=34563&a=53368

[22] *Sfgov | San Francisco Planning Department: Industrial Protection Zones - Special Use District*. (n.d.). Retrieved October 14, 2009, from http://www.sfgov.org/site/planning_index.asp?id=24991

[23] *Chapter 35 - Residential and Industrial Compatibility and Protection*. (n.d.). Retrieved October 14, 2009, from http://www.municode.com/library/HTML/14131/ch035.html

[24] *New Zoning & Finance Tools*. (n.d.). Retrieved October 14, 2009, from http://www.nyirn.org/index.cfm?fuseaction=page.viewpage&pageid=757

upzoned. The proceeds are to be used to fund the relocation of displaced industrial businesses to a site within a protected industrial area.

Covenants

In the quest to make industry a good neighbor, the physical layout of individual industrial sites and the overall character of industrial districts will play an indispensable role. Writing as early as the 1970's, the American Industrial Development Council, the Urban Land Institute, and other industrial advocacy groups came together in recognition that industry's precarious nature necessitated the use of more stringent and concerted land use controls. This was in the interest not only of minimizing the impact of industrial nuisances on surrounding areas, but also of protecting business investments and promoting the long-term growth and stability of industrial developments. In addition to their support for industrial zoning, these advocacy groups, collectively referred to as the National Industry Zoning Committee (NCIZ), crafted and made popular the inclusion of use *covenants* in the deeding of lots in industrial parks.[25]

Though the NCIZ no longer exists, use of the covenants they pioneered remains standard practice in the industrial development process. Use covenants, unlike zoning, are not subject to constant change. They function as private agreements and may be sued upon in court to compel compliance. To be changed, use covenants require the agreement of all subject parties, and they commonly last for as long as twenty years before requiring renewal.[26]

The following covenant outline provided in the Urban Land Institute's 1977 *Industrial Development Handbook* offers an example of the principal industrial design and performance considerations. While this checklist may have been considered comprehensive at that time, it should be noted that it does not necessarily reflect the growing intellectual movement toward sustainability. Additions may be necessary to adequately address the full range of relevant environmental concerns, and other location-specific considerations.

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[25] Lochmoeller, D. C. (1977). *Industrial Development Handbook*. Washington, D.C.: Urban Land Institute.

[26] Conway, H. M., Liston, L. L., & Saul, R. J. (1979). *Industrial Park Growth: An Environmental Success Story (Industrial Development Site Selection Handbook)*. Atlanta, GA: Conway Publications.

APPENDIX E

Checklist Outline for Covenants

Source: Harman O'Donnell and Henninger Assoc., Inc., Denver, Colorado

INDUSTRIAL

1. General Property
   a. Owners association
   b. Architectural control committee
   c. Extension of covenants to adjoining lands
   d. Safe, clean conditions and compliance with all government statutes, ordinances, regulations, health/police/fire requirements
2. Development Standards
   a. Building related
      (1) Minimum site size
      (2) Maximum building height
      (3) Lot coverage percent
      (4) Setbacks
         (a) Building
            —To street right-of-ways
            —To adjacent building sites
         (b) Loading docks
      (5) Architectural control
      (6) Loading
      (7) Building mechanical systems maximum distances from established buildings
   b. Landscape related
      (1) Landscaping standards
      (2) Visual quality
      (3) Signs
      (4) Maintenance
      (5) Refuse
         (a) Storage
         (b) Collection
      (6) Visual screen of outdoor storage
      (7) Rights-of-way, easements and utilities
         (a) Water
         (b) Sewer
         (c) Other utilities
         (d) Railroads
      (8) Off-street parking
      (9) Street design
      (10) Special zone lots for planned building groups
      (11) Permanent reference monuments
3. General Restrictions
   a. Nuisances
      (1) Noise
      (2) Smoke
      (3) Odor
      (4) Dust and dirt
      (5) Noxious gases and fumes
      (6) Glare
      (7) Heat
      (8) Vibration
      (9) Radiation
      (10) Fire hazards
      (11) Industrial wastes
   b. Allowed uses and restrictions

Because of their stringency, cities should seek, at the very least, to emulate covenant-style structure and security in the industrial land use controls they adopt. Detailed expectations about development and performance standards should be clearly expressed and codified with a reasonable but non-restrictive degree of specificity. These controls are key in protecting industrial land and engineering the character of industrial districts.

Development Standards

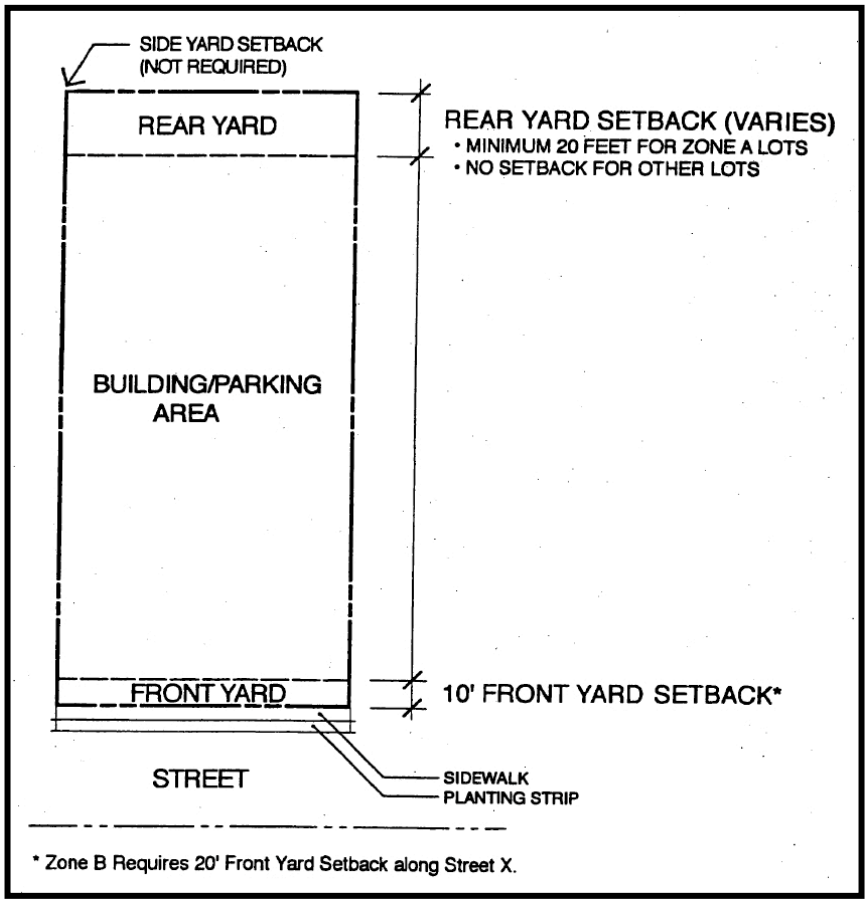
Design Standards

Some basic themes and considerations in the management of industrial land uses are recurrent across municipalities. These themes include: pedestrian-friendly streetscapes, preservation of local character, and nuisance abatement. Much of the perception of industrial nuisance derives from what individuals see as they drive or walk by industrial sites. Close attention to ensure that industrial lots are attractive, orderly, and consistent with surrounding neighborhood scale and appearance will reflect positively in local perceptions of industrial presence. The zoning framework of each city should addresses the basic tools used to achieve this goal.

Setbacks, maximum floor area ratios, building height restrictions, and architectural standards are just a few of the requirements imposed on industrial developments in an effort to shape or preserve overall neighborhood character. Controls requiring screening of outdoor storage and activities, landscaping, and other streetscape improvements are intended to enhance aesthetic appeal.

Suburban industrial park developers are keenly aware of the importance of aesthetics in industrial and large-scale commercial projects. They offer some of the most informative illustrations of quality industrial area design. The following diagrams were published within the design guidelines of the Mill Town Center Business and Industrial Park in Waipahu, Hawaii, approximately 15 miles from Honolulu. While not all of the specifications indicated by these sketches will be ideal for Atlanta's context, they provide a basis for reflection about the way policies on paper are manifest when executed through the development process.

Site Layout and Building Scale

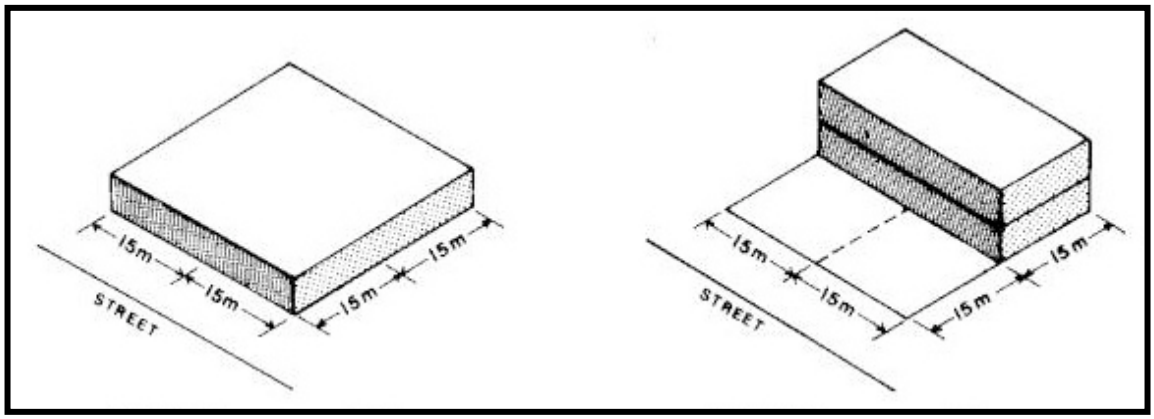


Source: *http://www.milltowncenter.com/images/stories/pdf/DesignGuidelines.pdf*

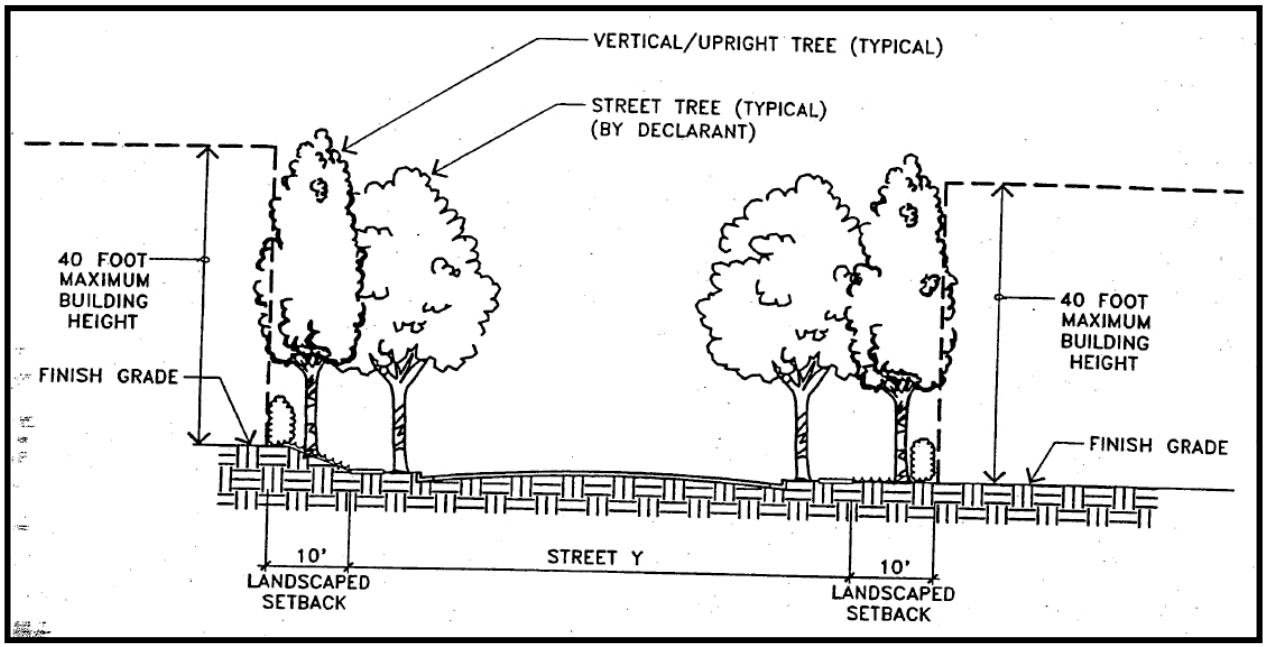
This illustration depicts basic site layout requirements. Space has been designated for a planted strip between the street and sidewalk and for a front setback between the sidewalk and building face. Additionally, a setback from the rear lot line has been established to separate the building from the use that abuts it. The size of the rear setback will vary depending on the zoning classification of the abutting lot. Side setbacks are not required.

This means that the building itself may occupy any of the land area between the dashed lines. The proportion of the lot it may cover and its height are determined by other guidelines. Floor area ratio, for instance, dictates the proportion of building floor space to actual land area allowed. The diagram below illustrates a 1:1 ratio in both instances, but the way the floor area of the building is situated in either produces significantly different results. For the purpose at hand, these differences play out most

consequentially in the efficiency of land use they promote, the varied pedestrian experiences they produce, and overall neighborhood characters they encourage.



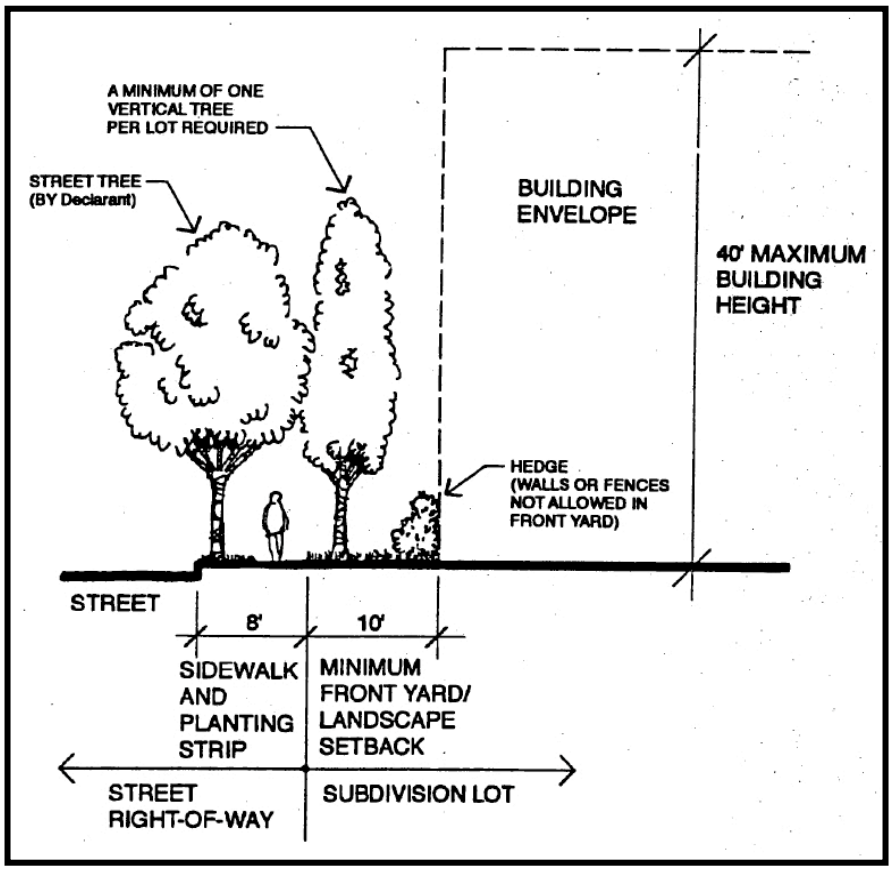
Streetscape



Source: *http://www.milltowncenter.com/images/stories/pdf/DesignGuidelines.pdf*

Walkability is an essential feature of any viable urban landscape. Well-designed walkways allay pedestrian safety concerns regarding passing automobile traffic. Planted strips, sometimes placed on either side of sidewalks, frame the pedestrian environment. Awareness of human scale in attending development serves to further enhance the pedestrian experience.

Careful attention should also be paid to ensure that motor vehicle access is adequately accommodated in the industrial setting. In addition to the needs of commuters in private automobiles, trucking traffic must have the ability to reach necessary sites, execute safe turns, and efficiently reach major highways. Ideally, commercial traffic activities occur in a pattern that minimizes interaction with private automobiles and, especially, pedestrian and bicycle traffic.



http://www.milltowncenter.com/images/stories/pdf/DesignGuidelines.pdf

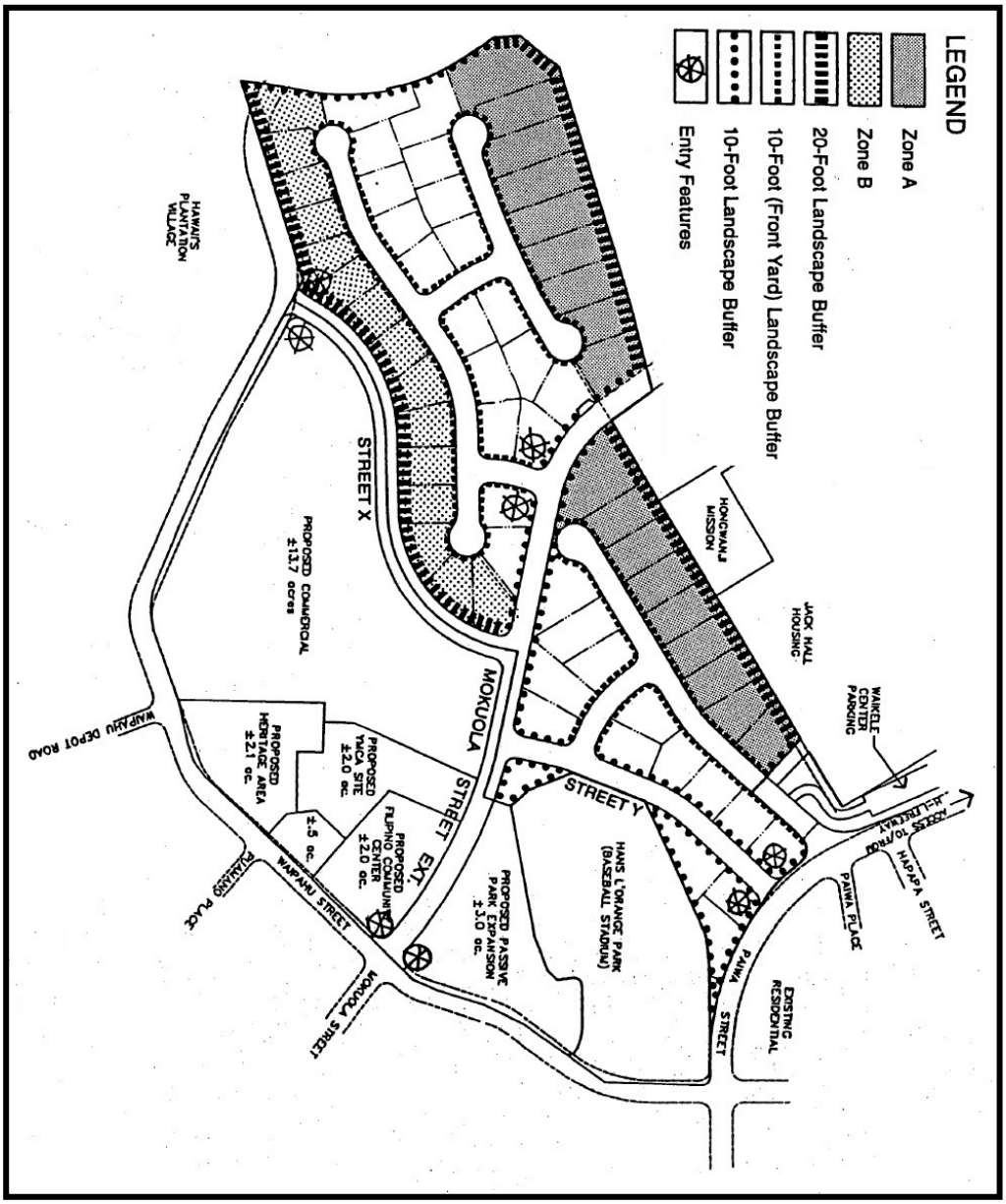
This graphic indicates that a planted strip of approximately four feet separates the sidewalk from the street. The ten-foot front setback provides additional space between the building face and the sidewalk. This space may be landscaped, but not walled or fenced.

Landscaping

Landscaping is a very effective way to add immense aesthetic appeal to a developed environment. It is also a means to demarcate boundaries, and, when well maintained, it is an indicator of care and close attention to detail. Landscaping might describe trees planted along major roadways, shrubbery

separating sidewalks from building facades, or simply grass in a planted strip between the sidewalk and street. Specific types of vegetation are commonly prescribed within development standards to create a desired landscaping affect.

The illustration that follows indicates the degree of landscaping that it required along the edges of lots within the park to adequately buffer it from surrounding uses. While uses within the park may not be noxious to those residing within the area, landscaping will provide an added measure of beauty and order to the local streetscape.



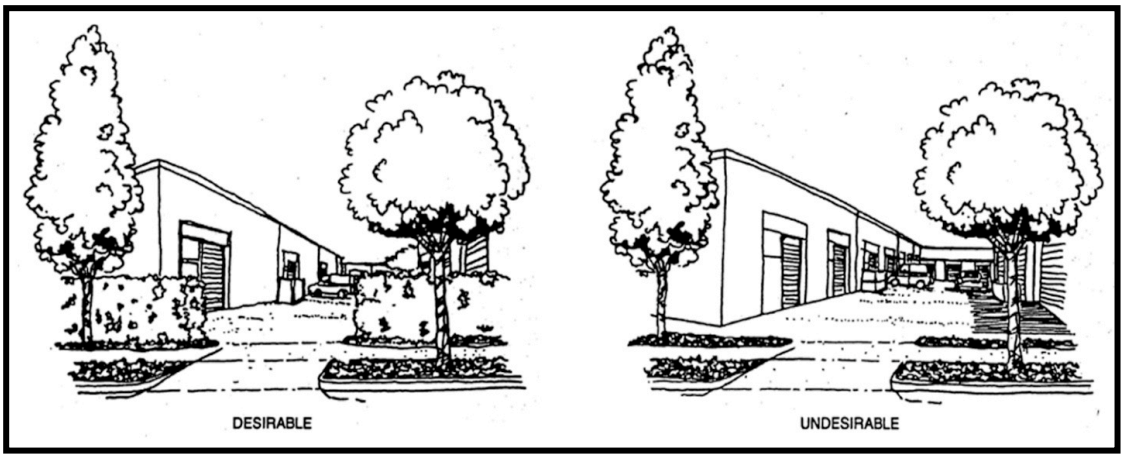
http://www.milltowncenter.com/images/stories/pdf/DesignGuidelines.pdf

Additionally, as Seattle's *Green Factor* suggests, landscaping is about more than just aesthetics. There are a number of environmental and economic benefits to be gained from increased urban landscaping. *Green Factor* is a city-wide program encouraging greater ecological sustainability through the development of *green walls*, *green roofs*, and rain gardens. The program cites vegetation's ability to clean the air, absorb carbon, cool and insulate buildings, and mitigate urban heat island effect.

Source: www.seattle.gov/dpd/greenfactor

Buffering

Landscaping is also a subtle and effective way of buffering unsightly elements or activities. The diagrams that follow illustrate how simple vegetative buffers can effectively shield or minimize outdoor activities or objects from street view, enhancing the quality of streetscapes.



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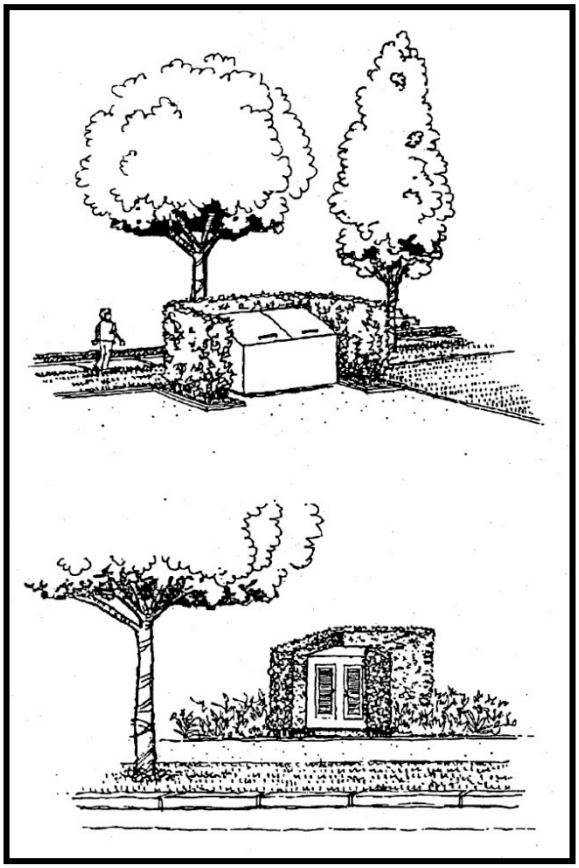


http://www.milltowncenter.com/images/stories/pdf/DesignGuidelines.pdf

Development standards are the principal means through which cities exert influence over the “design” of industrial areas. The tables that follow summarize the case study cities’ guidelines with regard to these basic standards.

City	Portland	Los Angeles	Los Angeles	Seattle	Seattle	Seattle	Chicago	Chicago
Zone Class	**I**	**MR**	**M**	**IB**	**IC**	**IG**	**C3**	**M**
Front Setback	maximum of 10 ft. if abutting a public walkway or transit street; area between building and street must be hard surface extension of sidewalk	5 ft. for lots <100 ft. deep; 15 ft. for lots >100 ft. deep	None where principal use is manufacturing or commercial; required where residential is principal use	5 ft. setback from street lot line opposite lots zoned low-density residential	Conditional; may be required to accommodate pedestrian, circulation or other infrastructure improvements	Conditional; may be required to accommodate pedestrian, circulation or other infrastructure improvements	Setbacks required only where C-zoned lot abuts R-zoned lot; setback must equal 50% of front yard that exists on adjacent R-zoned lot	Generally, none. M1 districts must provide a landscaped setback of at least 10 ft. along all lot lines that abut public streets; all M-zoned lots adjacent to R-zoned lots must provide a setback equal to the min. front setback required by on the R-zoned lot; must adhere to R-zoned front setback if street frontage is shared
Side Setback	maximum of 10 ft. if abutting a public walkway or transit street; area between building and street must be hard surface extension of sidewalk	None where principal use is manufacturing or commercial; required where residential is principal use	None where principal use is manufacturing or commercial; required where residential is principal use	5 ft. setback from street lot line opposite lots zoned low-density residential	Conditional; may be required to accommodate pedestrian, circulation or infrastructure improvements	Conditional; may be required to accommodate pedestrian, circulation or infrastructure improvements	Setbacks required only where C-zoned lot abuts R-zoned lot	Generally, none. M1 districts must provide a landscaped setback of at least 10 ft. along all lot lines that abut public streets; all M-zoned lots adjacent to R-zoned lots must provide a setback equal to the min. front setback required by on the R-zoned lot; must adhere to R-zoned front setback if street frontage is shared
Max FAR	None			2.5	2.5	2.5	Varies; 1.2-5	Varies; 1.2-3
Max Building Height	None	Varies by height district	Varies by height district	Generally, none; 26 ft at setback line for buildings opposite lots zoned low-density residential; height shall increase at 45 degree angle 35 feet from setback line	Varies	None	Varies by building type and lot frontage	Varies

City	Portland	Los Angeles	Los Angeles	Seattle	Seattle	Seattle	Chicago	Chicago
Zone Class	**I**	**MR**	**M**	**IB**	**IC**	**IG**	**C3**	**M**
Landscaping	Landscaping, arcade or hard surface extension of sidewalk required between structure and street; outside conservation districts, 15% of total site area must be landscaped			Street trees must be planted on any side of a use which is opposite a residential or commercial use and separated by a street less than 80 feet in width	Trees must be planted in street or sidewalk planting strips;	Generally, hedges or landscaped berms at least 3 ft. in height;	Outdoor work and storage areas adjacent to public streets or R-zoned lots must be screened by a vine-planted wall or vegetative buffer 6 to 8 ft in height	Outdoor work and storage areas adjacent to public streets or R-zoned lots must be screened by a vine-planted wall or vegetative buffer 6 to 8 ft in height
Buffering		Activities must be contained wholly by a wall not less than six feet in height	Activities must take place in an enclosed environment, surrounded by a solid wall of not less than 8 feet	For uses abutting residential lots, outdoor parking, loading and storage areas must be screened and landscaped	For uses abutting residential or neighborhood commercial lots, outdoor parking, loading and storage areas must be screened and landscaped	View-obscuring screening consisting of a wall or fence 6 ft. in height or landscaped berm which will grow to five feet in height within three years	All outdoor storage areas for good not for sale must be effectively screen from view of public streets	All outdoor storage areas must be screened and paved; chain-link fencing prohibited
Transportation	Only one double-loaded aisle of parking between a building and any street; no more than 50% of a site may be used for vehicle areas			Must meet transportation concurrency requirements	Must meet transportation concurrency requirements	Must meet transportation concurrency requirements	Parking must located to the rear of the principal building; drive-through facilities are expressly prohibited on lots abutting designated pedestrian streets	

City	Portland	Los Angeles	Los Angeles	Seattle	Seattle	Seattle	Chicago	Chicago
Zone Class	**I**	**MR**	**M**	**IB**	**IC**	**IG**	**C3**	**M**
Other Amenities	One tree, bench, drinking fountain or kiosk for each 100 sq. ft. of hard-surface area between building and street lot line.			Floor area bonus for affordable housing or child care facilities	Floor area bonus for affordable housing or child care facilities	Floor area bonus for affordable housing or child care facilities		
Other Restrictions	Roof-mounted equipment must be screened; 100% building coverage permitted in IG1 and IH, 85% in IG2; no pedestrian standards	minimum loading space is 400 sq. ft.; additional loading space required for buildings >50,000 sq. ft.	minimum loading space is 400 sq. ft.; additional loading space required for buildings >50,000 sq. ft.	Exterior ventilation equipment must be sited and directed away from adjacent residential uses			Min. 30 ft. rear setback required for buildings containing dwelling units	30 ft. rear setback required if M-zoned rear lot line or alley abuts rear or side lot line of an R-zoned lot; outdoor work areas not permitted in M1 districts

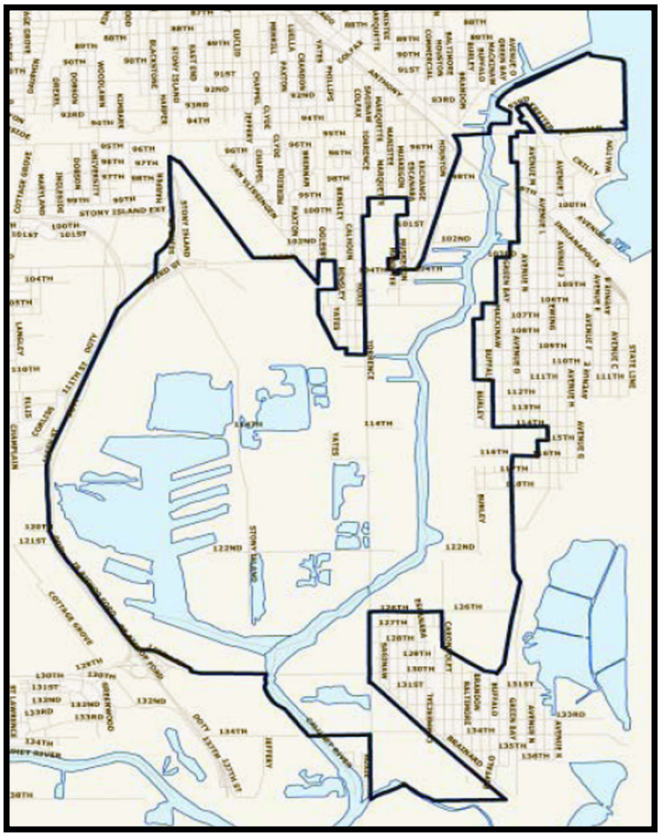
Design Guidelines

Design guidelines are now common for many central city and suburban neighborhoods. They function differently from the regulations and standards found in zoning codes. As John Punter states, “they provide a design guidance system that is helpful and flexible, but which leads one through a *process* that creates desired results.” In other words, design guidelines are a means for communities to achieve desired character and inject community personality. There is a trend among major cities of developing general guidelines, mostly for downtown development, but devolving the power to create neighborhood-specific design guidelines.

Unfortunately, additional standards explicitly detailing urban approaches to industrial development remain rare. Nonetheless, some cities have articulated guidelines which provide useful insight, each with the aim of preserving distinct locational context. Their guidelines offer a more detailed view of their unique design priorities and goals. In Chicago, for instance, special environmental and infrastructural needs demanded the creation of guidelines to ensure ecological sensitivity and balance.

Chicago – Calumet Planned Manufacturing District

The Calumet region was once a vast system of wetlands and marshes. Years of industrial activity in the area had a devastating impact on its ecological balance. Many waterways and soils suffered contamination, and Lake Calumet was dredged several times to meet the changing needs of freight vessels. Since a substantial portion of Chicago’s land for industrial expansion lies within its Calumet region, there arose a pressing need to set the area on a path toward long-term sustainability. In addition to the desire to preserve Calumet’s ecologically sensitive environment, the lack of an established sewer system within the district necessitated that special steps be taken to facilitate on-site stormwater management. Through the establishment of an extensive design process centered around location-specific design guidelines, Chicago’s Planning Department hopes to assist future developers in creating an environment where “industry and nature coexist.”



Source: *http://egov.cityofchicago.org/webportal/COCWebPortal/COC_ATTACH/Calumet_Design_Guidelines.pdf*

Widespread contamination created the necessity for procedures regarding soil rehabilitation and hazard mitigation. Calumet's design guidelines indicate the status of soils by site as well as soil mixing and remediation techniques based on anticipated land use. Because the region consists of vast wetlands, water management is also a principal concern. The guidelines facilitate developers in the design of special pervious surfaces for motorized vehicle use, and call for the inclusion of "prairie" similar to that which occurs naturally within the region for its ability to maximize ground water absorption. Calumet's design guidelines provide a great example of how many communities are using this unique policy tool to create and preserve local character, and to meet special contextual needs.

Industrial Redevelopment

With recent trends favoring the conversion of industrial lands and buildings to non-industrial uses, few locations provide current, relatable examples of district-level industrial-to-industrial conversion. A small group of actors is, however, entrenched in the battle to readapt industry to the urban setting. One such organization is *Infill Philadelphia*, an initiative of Philadelphia's *Community Design Collaborative*. Infill Philadelphia is actively involved in efforts to create unique design solutions for the revitalization of underperforming inner-city neighborhoods. Through their solicitation of projects involving the readaptation of former industrial facilities for new industrial uses, they have begun to amass a body of knowledge and develop connections to firms at the forefront of industrial reclamation.

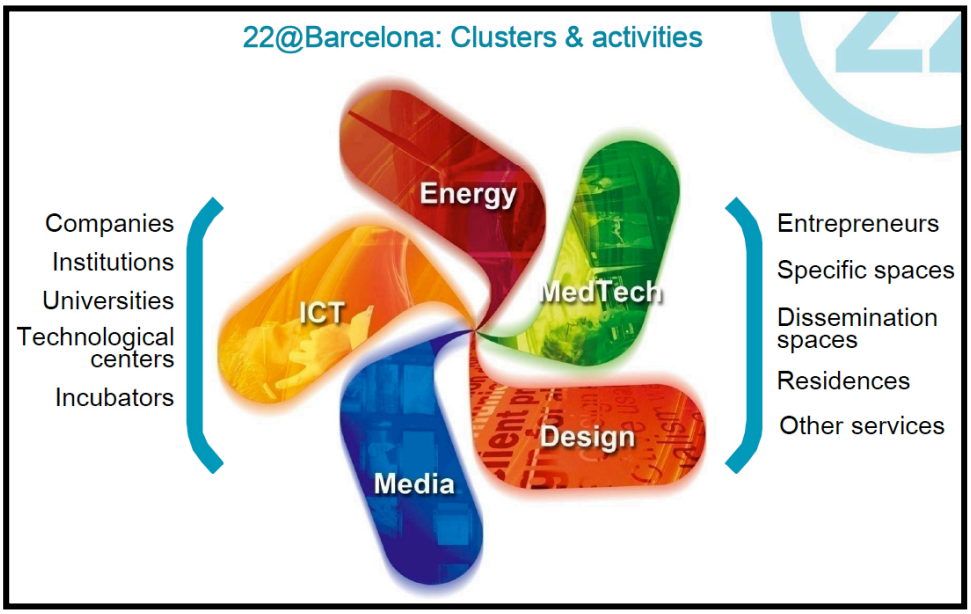
These firms take on a variety of forms: for-profit, not-for-profit, architecture-based, and otherwise. The *Greenpoint Manufacturing Design Center*, for instance, started in the 1980s, serves a significantly underappreciated niche market as the only nonproft industrial developer in New York City. This organization acquires, reconditions, and manages derelict industrial buildings, enabling small and medium-sized manufactures and artisans to obtain affordable production space. To date, Greenpoint has redeveloped more than 500,000 square feet of Brooklyn's industrial floor space that is now home to more than 100 businesses employing some 500 people. The organization is also an active policy advocate, seeking necessary resources for redevelopment ventures, building and maintaining essential community networks, and providing technical assistance to communities desiring to take on industrial rehab projects.

Source: http://www.gmdconline.org/about/GMDC_AnnualReport.pdf

Greenpoint is a uniquely innovative group providing a service that is growing rapidly in importance. They, along with organizations like the Community Design Collaborative, are developing the tools that will be needed to retrofit America's inner cities for the great industrial revival that is to come. Barcelona, Spain is just one of several international cities that has embraced industry's *second coming*. The city's new plan, designed to recapture urban commerce and cradle a burgeoning new knowledge economy might provide key insight into what urban industry's future holds.

22@Barcelona – The Future of Urban Industry?

The *Innovation District* is the intended goal of a major redevelopment of Barcelona's Poble Nou industrial area, the planning for which began in the 1990s. The concept centers on the drive to reorient the city's economic basis, establishing it as a node of activity for the information and communications technology industries: "those activities that use information as a raw material, and whose end product is knowledge" (General Municipal Plan, 14)[27].



Source: http://www.22barcelona.com/documentacio/22barcelona_2009_cat.pdf

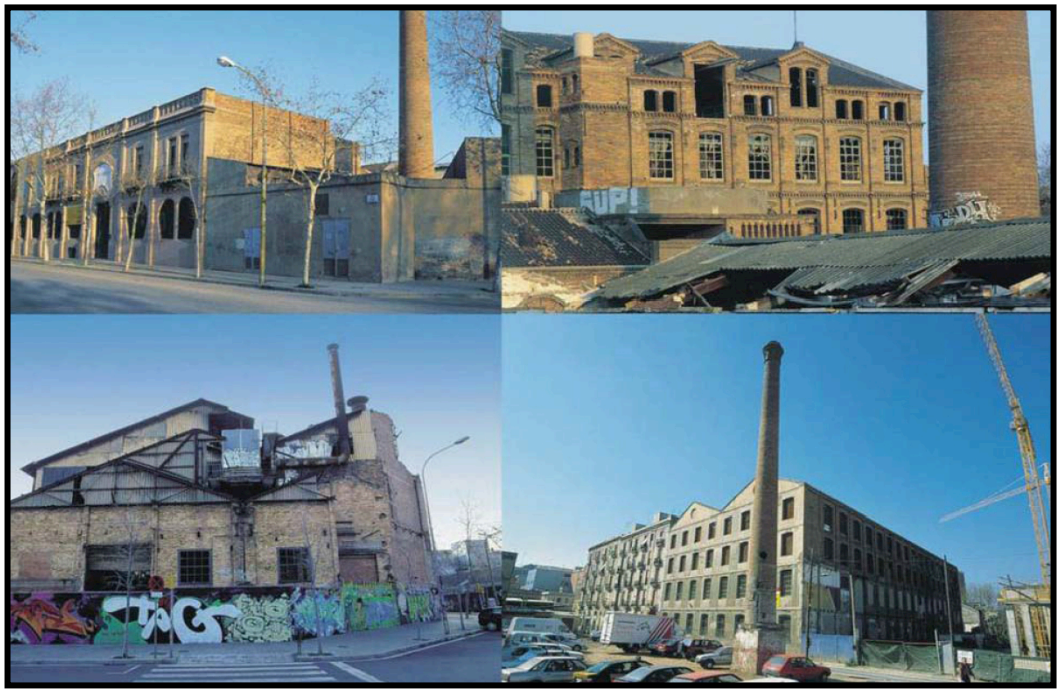
27 Modification of the PGM (General Municipal Plan) for the Renovation of the Industrial Areas of Poblenou;.Retrieved January 14, 2010 from http://www.22barcelona.com/component/option,com_remository/Itemid,750/func,select/id,23/orderby,1/lang,en/.

Once boasting the title "factory of Spain," the plan represents the city's bold aspirations to transform itself from the national leader in manufacturing to a leading knowledge hub. Still embracing a manufacturing legacy to some degree, though, an intent remains evident to hone in on Barcelona's future role in the development of mid and high-tech products, while consciously nurturing the strong knowledge economy essential to the conception of such products. "To a large extent, the future of its competitive capacity will depend on its [ability] to integrate new technology and to intensify the tertiary-industrial activities rich in knowledge" (General Municipal Plan, 13)[28].

Acknowledging that recent industrial development has shown a tendency toward division of the production sphere from those of recreation and housing, the 22@ Plan raises the point that several "world class" cities have successfully revived ailing urban industrial areas through linkage to the 'new' industries of information and communications. It asserts that *22@* will advance this concept, re-linking production activity to the urban core, and creating an environment with "strong interaction between the activities that comprise the productive and residential fabric" (General Municipal Plan, 20)[29]. As the Plan, indicates, the city's *Cerdà Grid* system of streets has been exceedingly transcendent, demonstrating a capacity to accommodate changes in land use and building typology, and the ability to organize high-density traffic.

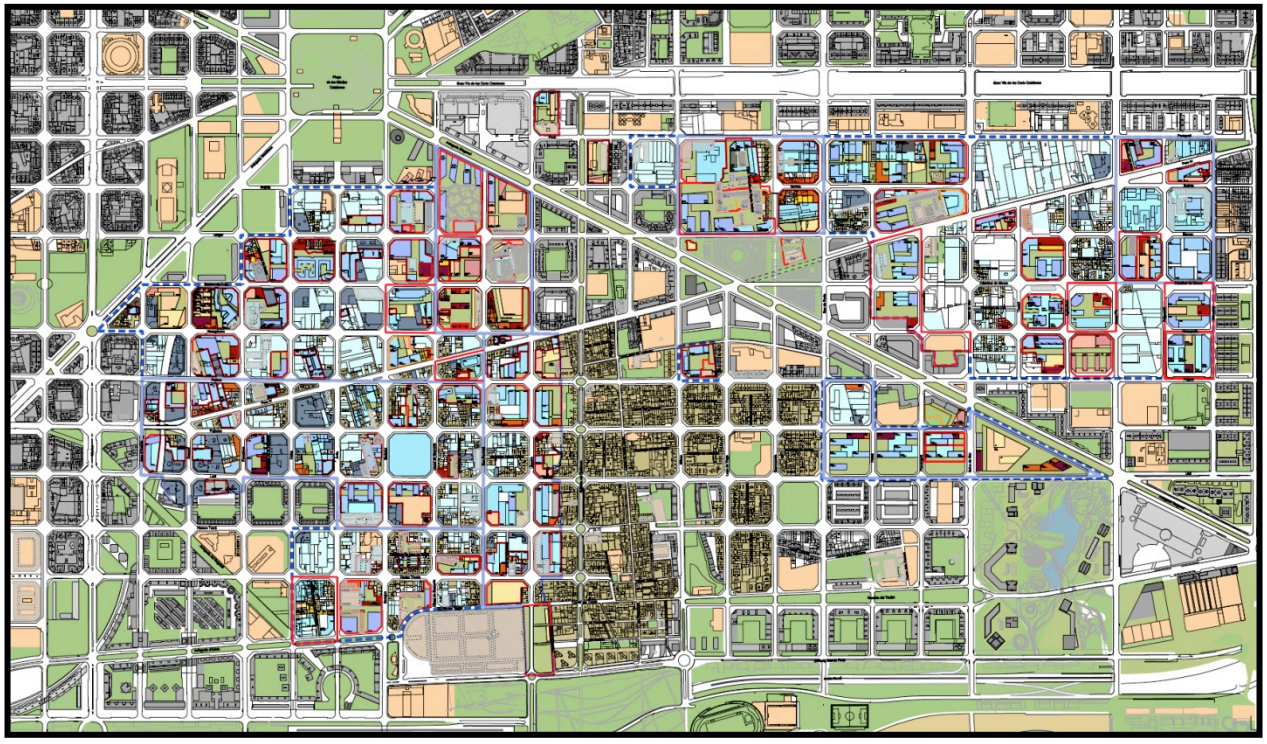
[28] Modification of the PGM (General Municipal Plan) for the Renovation of the Industrial Areas of Poblenou;.Retrieved January 14, 2010 from http://www.22barcelona.com/component/option,com_remository/Itemid,750/func,select/id,23/orderby,1/lang,en/.

[29] Modification of the PGM (General Municipal Plan) for the Renovation of the Industrial Areas of Poblenou;.Retrieved January 14, 2010 from http://www.22barcelona.com/component/option,com_remository/Itemid,750/func,select/id,23/orderby,1/lang,en/.



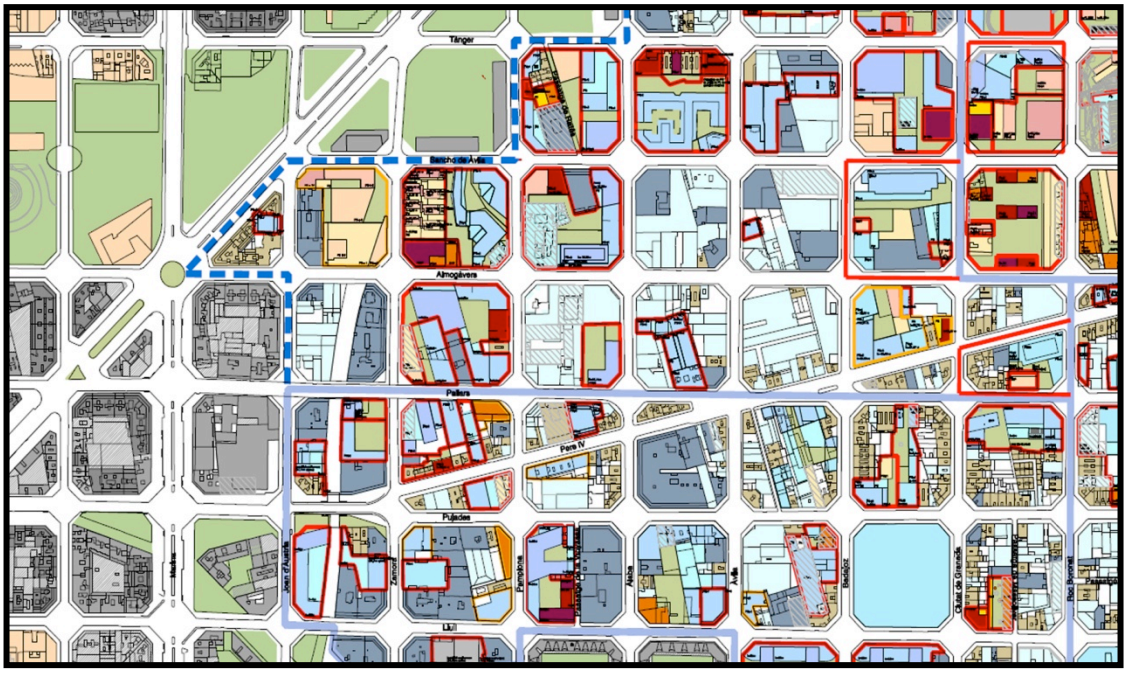
Dilapidated industrial buildings in Poble Nou prior to the start of 22@Barcelona renovations

Source: http://www.22barcelona.com/documentacio/22barcelona_2009_cat.pdf



22@ Barcelona – Plan Area Map

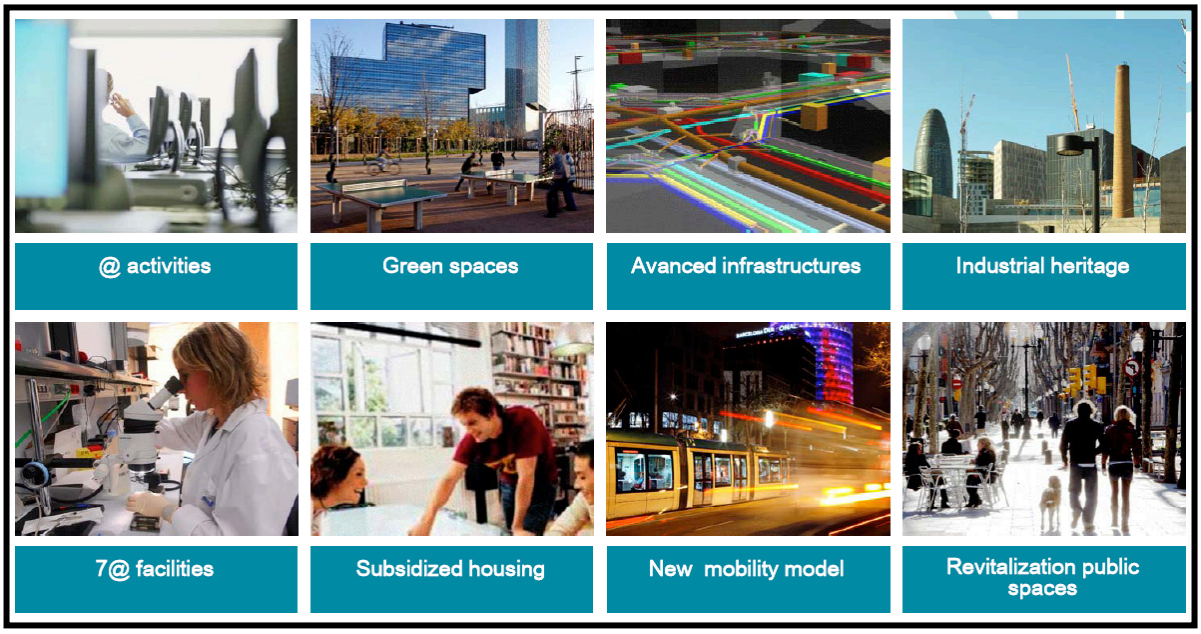
Source: http://www.22barcelona.com/content/view/385/740/lang,en/



The Cerdà Grid Network

Source: http://www.22barcelona.com/content/view/385/740/lang,en/

A focus on sustainability is evident in the Poble Nou project. Many housing developments that were built despite their noncompliance with plans for the area have produced what officials note as a "positive urban effect." The presence of housing in an area of intense economic activity has an agglutinative effect, they say, generating street life and diversifying local activity. Such being the case, they have included plans to allow a greater number of housing units. This effort to link disparate spheres of life, they believe, will ensure the district's sustainability.



Source: http://www.22barcelona.com/documentacio/22barcelona_2009_cat.pdf

In the interest of creating and maintaining a desirable mixed-use urban environment, the district excludes industrial activity deemed polluting, dangerous, or a nuisance. It also limits warehousing and distribution services to levels necessary for the efficient functioning of local businesses. Use-intensive industries and those utilizing large commercial vehicles are expressly secluded to the urban fringe.

A redeveloped streetscape and a public courtyard within 22@Barcelona.

Source: (1) http://www.flickr.com/photos/jupana/4028119553/ ;(2) http://www.flickr.com/photos/jupana/4028131291/

The black pads on the ground function to separate cyclists from motor vehicle traffic. They are intended to be wide enough to prevent cyclist injury due to collision with vehicle doors.

Barcelona stands as yet another example of a city poised to distance itself from the manufacturing and production-oriented base that powered its ascent. Though its plan begins with language honoring its industrial past, a subsequent discussion of land use regulation reveals an already-present intent to exclude a great number of business undoubtedly well integrated into its current economic structure on the basis of environmental incompatibility. Again resurfaces the perception of industry's incongruence with the principles of urbanism and "good" neighborhood design.

With so many communities in conscious opposition, for the city with the goal of reintroducing industry to the urban context, the question of whether industry *can* co-exist with other uses should be thoroughly considered. If the answer remains "yes," the evidence to the contrary only serves to accentuate the need for clear economic priorities, and confidence in the dedication of time, finance, and innovation resources necessary to recreate the form of industry in the likeness of the urban mold.